

Baltimore County Public Schools

Dr. Joe A. Hairston, Superintendent
J. Robert Haines, Esquire, Deputy Superintendent

Department of Physical Facilities

Michael G. Sines, Executive Director
William Wingerd, Administrator, Office of Operations
Dennis N. Elkins, Administrator, Office of Maintenance and Grounds
J. Kurt Buckler, PE, Administrator, Office of Engineering and Construction

Report on Physical Facilities Including Air Conditioning Feasibility



Baltimore County Public Schools

Report on Physical Facilities
Including Air Conditioning Feasibility

Preface

Under the direction of the Superintendent of Schools, Dr. Joe A Hairston, and in response to a request by Board members, the following report is intended to:

- **provide an assessment of the current condition of physical facilities**
- **provide relevant information regarding the installation of air conditioning in schools.**

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History / Status of Physical Facilities

Inventory Information

Total Number of Buildings

Baltimore County Public Schools uses the following three criteria to define **school**, for the purpose of AYP reporting:

- Long-term official student enrollment
- Testing information is reported
- Adequate Yearly Progress (AYP) is reported

Any organizational structure (see definition below) that does not meet all three criteria is considered either a center or a program. The following chart provides summary information of the types of organizational structures, the extent to which they meet the criteria of a school, and the current number of each.

Organizational Structures: Criteria Met and Numbers

<i>Organizational Structure</i>	<i>Long-term Official Student Enrollment</i>	<i>Testing Information is Reported</i>	<i>AYP is Reported</i>	<i>Total Number 2008-2009</i>
School	Long-term	Yes	Yes	160
Center	No	No	No	10
Program	No	No	No	2

The following definitions are provided to ensure clarity when referring to schools, centers, programs, facilities and offices:

School – An organizational structure that is used by staff and students where students are officially enrolled for educational purposes, testing information is reported, and the Adequate Yearly Progress (AYP) is reported. Total number of Schools for school year **2008-2009 = 160**.

Center – An organizational structure that is used by staff and students for educational purposes where students are officially enrolled on a short term basis, testing information is not reported at a center, but returned to schools, and no Adequate Yearly Progress (AYP) is reported. Total number of Centers for school year **2008-2009 = 10**.

Program – An organizational structure that is used by staff and students for educational purposes where no students are officially enrolled (students remain enrolled at school or center), testing information is not reported at the program, but returned to schools, and no Adequate Yearly Progress (AYP) is reported. Total number of Programs for school year **2008-2009 = 2**.

Facility – A physical structure or building (owned or rented) that may be used for staff (offices) and/or students (school, center, or program).

Office – A facility that is used by staff as a work environment to meet the needs of the school system.

Organizational Structure – Delivers (or provides for the delivery of) the BCPS curriculum to meet the instructional needs of students, may or may not be a facility.

Baltimore County Public Schools: 2008-2009 School Year

	Centers	Area	Type	Open	Notes
1	Bridge Center	NW	TRANSITION	2005	Leased
2	Caton. Ctr. Alt. Study	SW	ALT	1958	
3	Evening High School	ALL	ALT	1938	Leased
4	Meadowood Ed. Ctr.	SW	ALT	1999	
5	Rosedale Center	NE	ALT	1948	
6	Home Assmt Primary	ALL	ALT	1986	
7	Home Assmt - Sec	ALL	ALT	1986	
8	Afternoon Group Learning	ALL	ALT	1984	Leased
9	Campfield EC Center	NW	K/PreK	1954	
10	Crossroads Center*	NE	ALT	2007	

*Secondary Academic Intervention Model

	Programs	Area	Type	Open
1	Home & Hospital	C	ALT	1887
2	Sollers Point	SE	HIGH	1948

Totals for 2008 - 2009 School Year

High	24
Middle	27
Elementary	105
Special Education	4

Schools 160

Centers 10

Programs 2

Total Organizational Structures 172

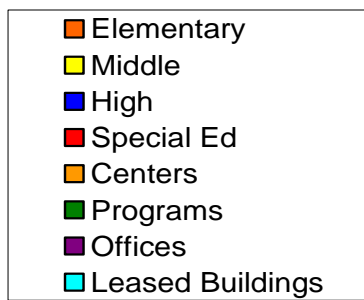
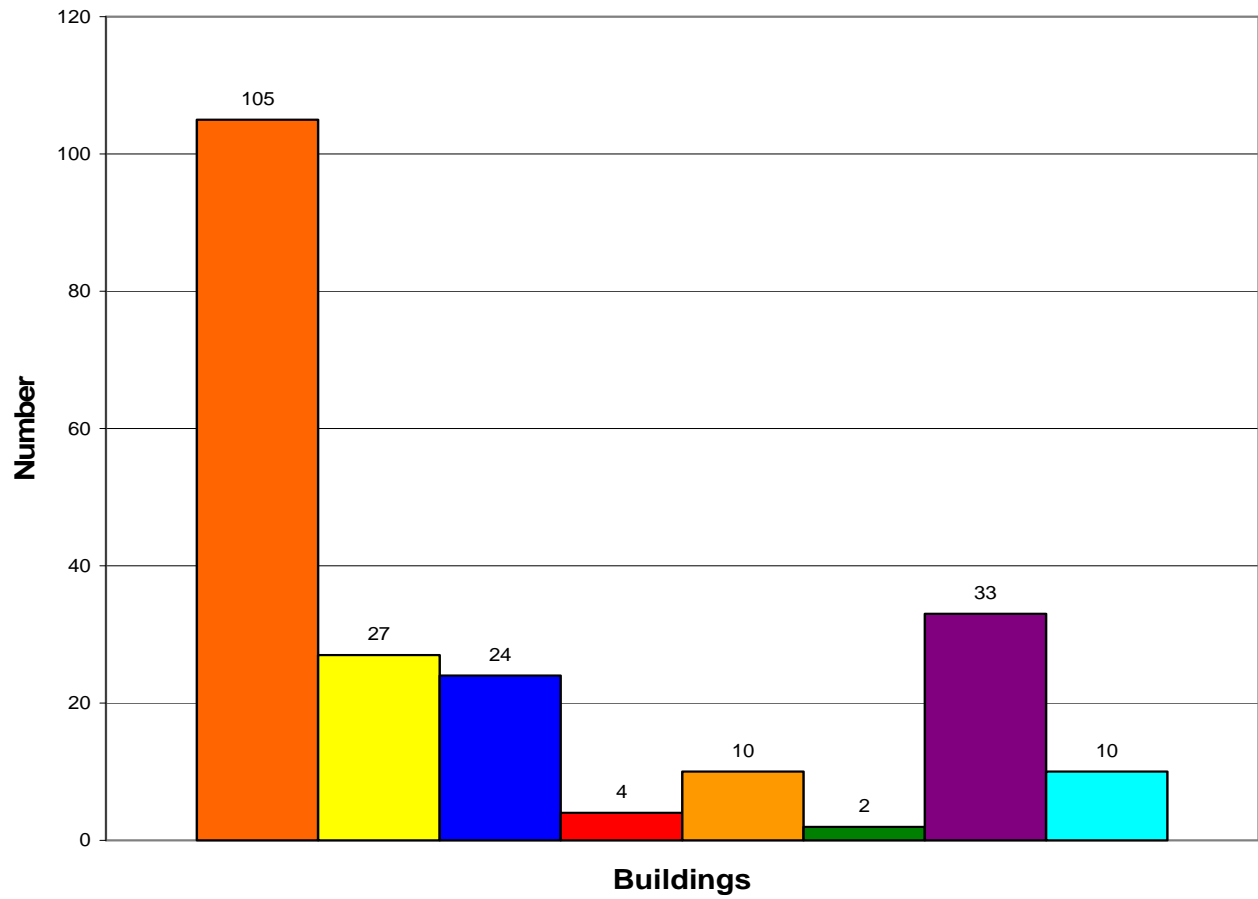
Note: Non-public placements are not part of the BCPS organizational structure.

* The information above was provided by the Office of Strategic Planning

School Facilities Square Footage

Elementary Schools	6,285,386
Middle Schools	3,810,425
High Schools	5,239,232
Other	405,190
Total Square Footage	15,740,233

Total Number of Buildings



Age of School Buildings

The Age of School Buildings (page 9) chart shows the quantity and types of schools that were built during certain date ranges. For the purposes of this chart, alternative, special education, and K/PreK were combined and represented as “*Other*.” The information is based on the current usage of the school and does not include additions.

The oldest BCPS building was opened in 1887 and is currently the location for the Home and Hospital Program. During the years 1887 to 1949, there were thirteen (13) elementary schools, four (4) middle schools, four (4) high schools and two (2) alternative schools built.

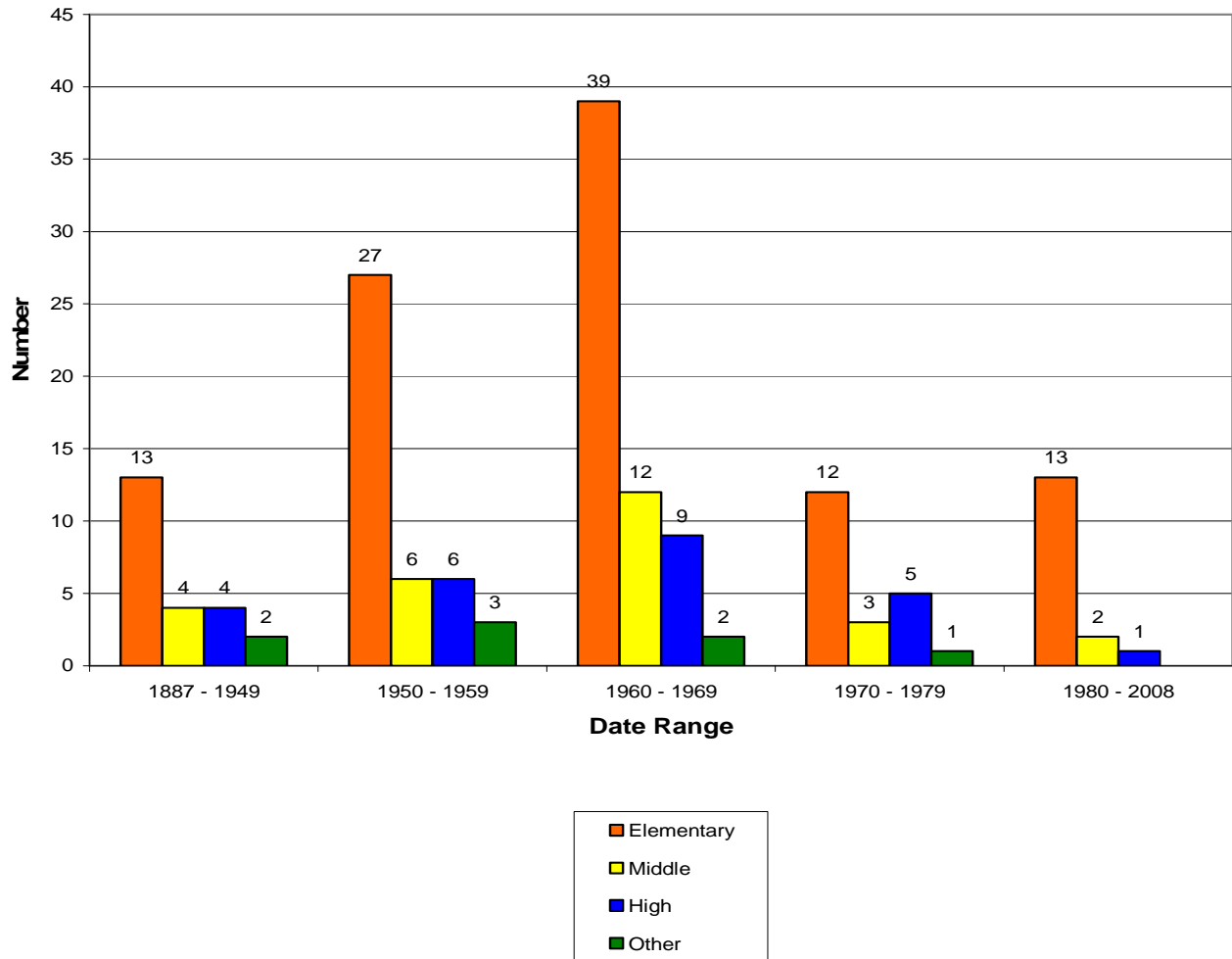
From 1950 to 1959, twenty-seven (27) elementary schools, four (4) middle schools, four (4) high schools, one (1) alternative, one (1) special education, and one (1) K/PreK were built.

Baltimore County experienced major growth between 1960 and 1969, which had a significant impact on Baltimore County Public Schools (BCPS). During this period, thirty-nine (39) elementary, twelve (12) middle, nine (9) high schools and two (2) special education schools were built.

BCPS reached a peak of one hundred thirty-four thousand, forty-two (134,042) students between 1970/1971. Thereafter, the demand for new construction began to subside. From 1970 to 1979, twelve (12) elementary schools, three (3) middle schools, five (5) high schools and one (1) special education school were built.

Enrollment in Baltimore County Public Schools diminished to eighty thousand, six hundred thirty (80,630) students in the mid 1980s. Over the next two decades, enrollment increased to one hundred eight thousand, seven hundred ninety-two (108,792) in the mid 2000s. During the 1990s facilities constructed between 1960 and 1979 were in critical need of replacement or renovation. From 1980 thru 2008, thirteen (13) elementary, two (2) middle, and one (1) high school were built.

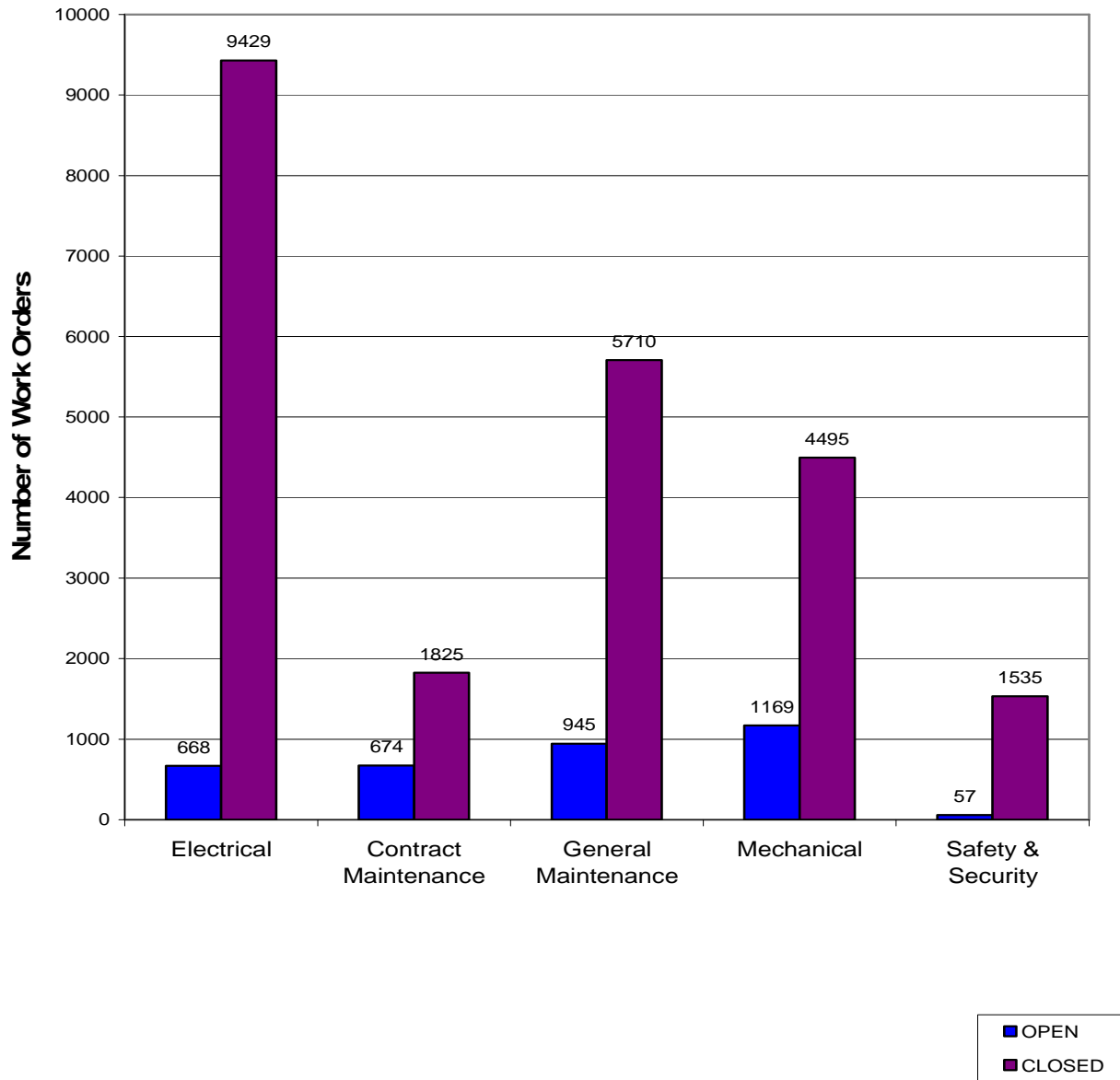
Age of School Buildings



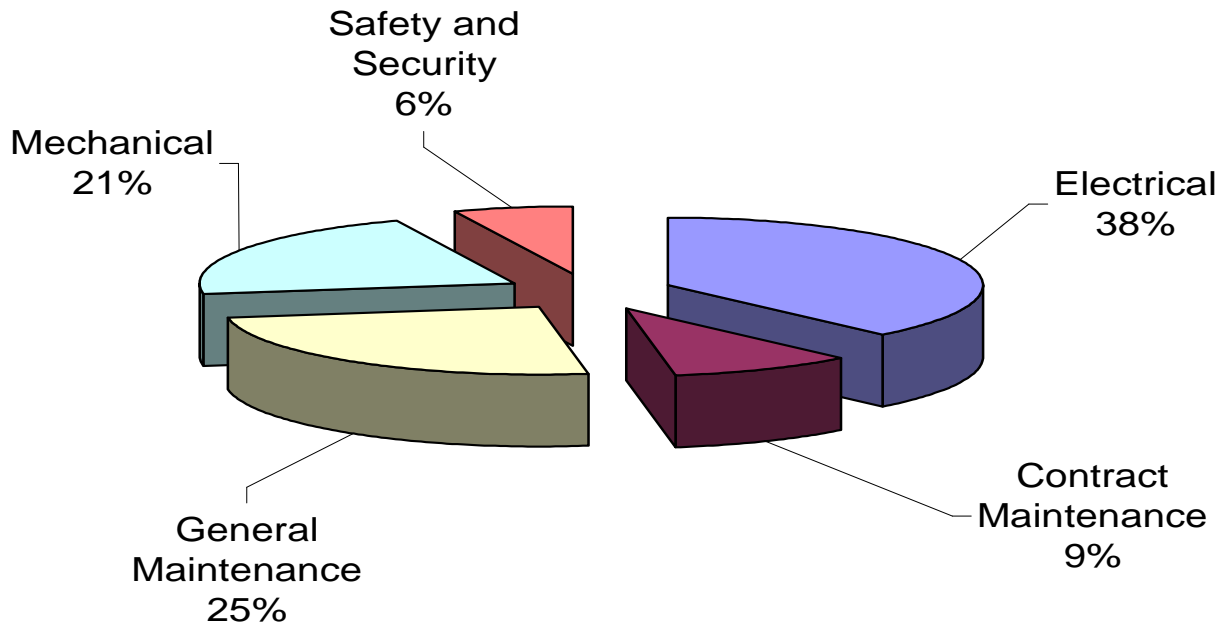
Computerized Maintenance Management System

The Computerized Maintenance Management System (CMMS) is used to schedule, track and measure data. The database will capture and store information relating to work orders, building and equipment maintenance history, inventory tracking and costs of labor and material. XM Web is used for schools to report on-line, via the intranet, work requests and work order status.

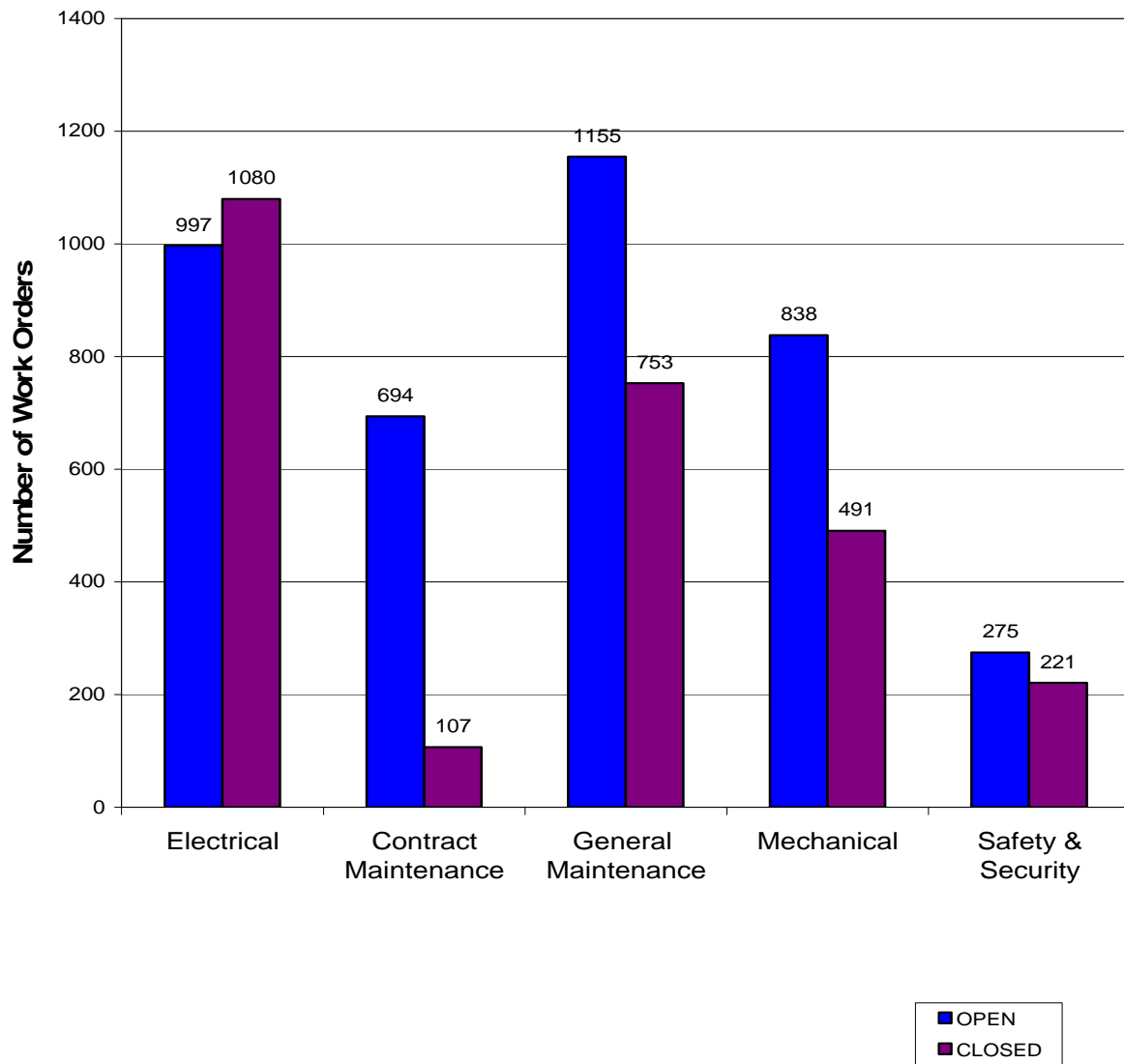
Open/Closed Work Orders FY 07 - 08
July 1, 2007 through June 30, 2008



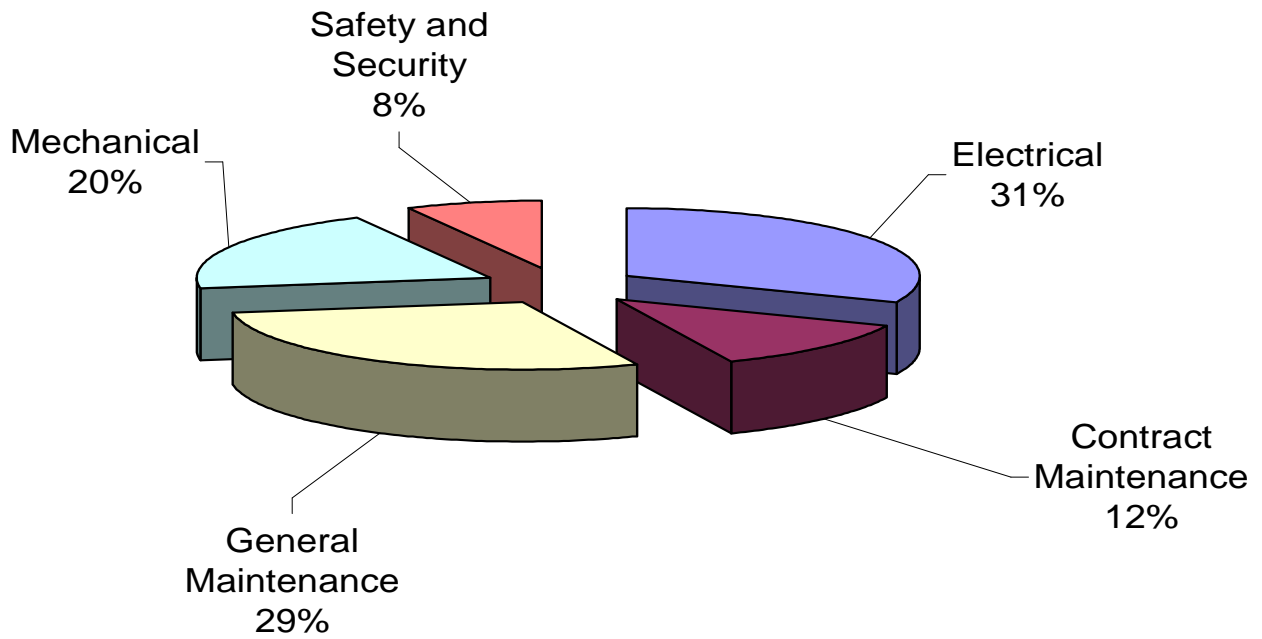
Work Orders FY 07 - 08
July 1, 2007 through June 30, 2008



Open/Closed Work Orders FY 08 - 09
July 1, 2008 through September 18, 2008



Work Orders FY 08 - 09
July 1, 2008 through September 18, 2008



Capital Program Database

- As illustrated in the graphs (Total Number of Buildings and BCPS Historical Enrollment Trend, pages 5 and 21) approximately 75% of all school facilities in BCPS were constructed between 1950 - 1980.
- The basic building infrastructure systems (mechanical, electrical, windows, doors, etc.) have a life expectancy of 15 to 40 years. As a consequence of normal wear and tear, and average life cycle expectancy, the majority of the school system's infrastructure needed refurbishment or replacement in the 1990s.
- The State of Maryland Public School Construction Program (PSCP) Guidelines allow for State funding participation of systems that are 16 years old or older (See Appendix - Section 400 Systemic Renovations).
- A new program utilizing the Computerized Maintenance Management System (CMMS) software is currently under development to track all capital project activities within the school system. All State funded projects are recorded in a State sponsored database, which can be accessed and viewed in the public domain (www.pscp.state.md.us). Prior to the current program under construction, the department has not had a universal database to record local capital program information.

Department of Physical Facilities
Grounds Program

The Office of Grounds maintains approximately 4,000 acres at more than 180 locations around Baltimore County. School exterior properties are **an extension of the classrooms, which are used daily as places of learning and study for students in subjects such as; environmental science, horticultural studies, physical education, music (band) classes, and other school program based activities.** The proper maintenance of grounds (fields, walkways, roadways, sub-surface utilities, etc.) is essential to safeguard the safety and well being of students and staffs.

Each day, tens of thousands of students take to the athletic fields participating in learning activities involving a variety of sports such as field hockey, lacrosse, baseball, soccer, football, softball, and other sports. There is a growing trend to use sporting events to teach team concepts as well as the promotion of individual personal growth. Recently, there has been data published on “KidsHealth.org”¹ and “Adventistrisk.org,”² to support the importance of regular exercise for children as well as adults. Baltimore County Public Schools grounds are used for both local and regional sporting events. Regional events showcase the properties and school system. Well maintained campuses promote the school system in a positive manner while supporting the educational community and personal property values. School grounds also provide space for individuals and communities to recreate during non-student school hours. It is common to observe community members walking on a high school track, playing tennis, basketball, a pick-up game of baseball or just spending time on the properties with their children or grandchildren.

Baltimore County Public Schools properties serve as parks and natural areas; the grass and trees clean the air and produce oxygen as well as provide homes to thousands of local and migratory birds and animals. BCPS properties abut critical streams that support the reservoirs and bay providing an important buffer along with sediment control, which protects fragile wetlands.

School grounds include parking lots and walkways which facilitate safe parking and egress to and from the buildings. Today, in many schools, the enrollment and use have outgrown the original design intent. In many cases there is inadequate parking and ADA access to buildings and grounds is deficient. This is due in some cases to increased enrollment and the increased demands resulting in the utilization of itinerant staff to serve students needs. Additionally, since the original construction, many new ADA laws have been enacted affecting parking lots and sidewalks.

Sub-surface infrastructure includes an intricate network of pipes, drains, and wires which carry gas, electric, and water into and away from the buildings and properties. This network of piping is, in many cases, original from the initial school construction, and a failure of any of these systems can cause closure for multiple days. Underground water lines, sewage lines and stream lines will need maintenance or replacement some time between ten and thirty years after

¹ *Kids and Exercise*, http://kidshealth.org/parent/nutrition_fit/fitness/exercise.html, (September 2008).

² Washington Adventist Hospital, *Benefits of Exercise*, <http://www.adventistrisk.org/Wellness/index.php?q=node/25>, (September 2008).

construction.³ In addition to the underground pipes, the concrete pavement and curbing, bituminous pavement, retaining walls, and fencing, which are all part of the exterior infrastructure located within and on the grounds of the Baltimore County Public Schools, will also need maintenance to provide adequate protection to students and as reasonable stewardship of facilities.

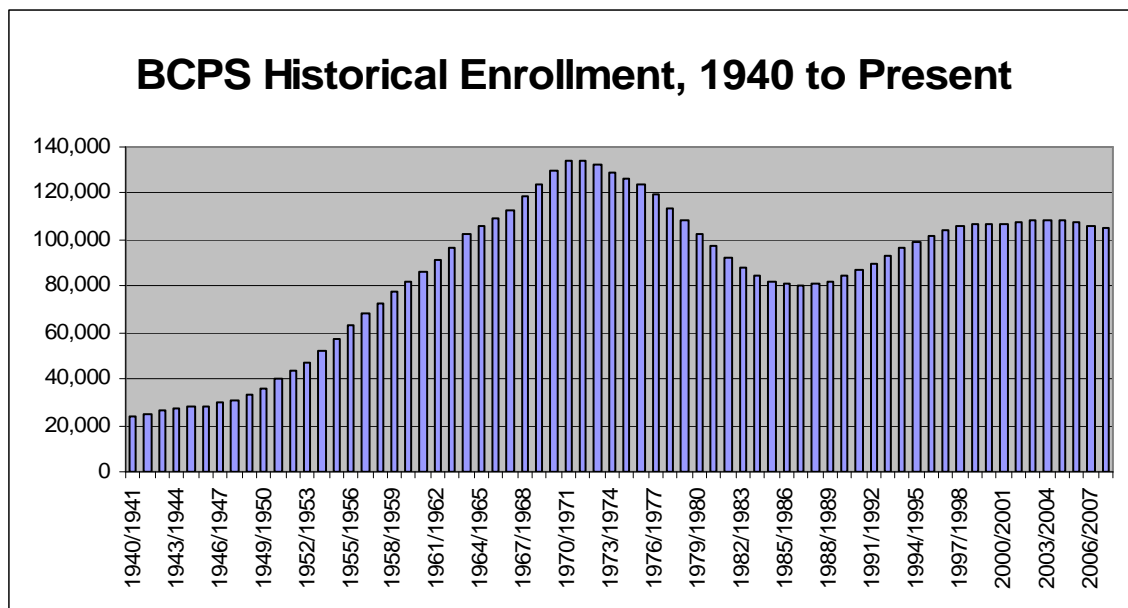
On another issue related to the many tasks performed by the Office of Grounds, is the interaction with Baltimore County Government in regard to snow removal. This unique arrangement where 20 of Baltimore County Public Schools largest dump trucks and drivers report to assist in snow removal on county roads was negotiated⁴ in 1995 between the two agencies. In this agreement, Baltimore County Public Schools receives salt to apply to school drives and parking lots, which assists the process of melting snow and ice, while the county receives the services of trucks and drivers that report to Baltimore County Government until the conditions are deemed safe by county inspectors. This arrangement was requested by Baltimore County Government after downsizing their workforce. After work is completed on the roads, these same trucks and drivers respond to the school needs. This oftentimes contributes to the difficult task of getting the schools open and safe for operation.

³ *Guidelines for Maintenance of Public School Facility in Maryland*, <http://www.pscp.state.md.us/Reports/MAINTENANCE%20GUIDELINES%20DOC%20FINAL%207-15-08~3.pdf>. (September 2008)

⁴ Board of Education / Baltimore County Highways, *Joint Snow Removal Assistance Program*, February 27, 2004.

Capital Improvement Program

BCPS Historical Enrollment Trend



Data provided by the Office of Strategic Planning

As illustrated in the Historical Enrollment Trend graph, Baltimore County experienced a rapid increase in student population between 1950 and 1970. The school system served approximately forty thousand (40,000) students in 1950. During the period between 1950 and 1970 the public school system tripled its student enrollment by exceeding one hundred thirty-four thousand (134,000) students.

In response to the unprecedented increase in student enrollment, forty-two (42) schools were constructed in the 1950s with an additional sixty-two (62) schools in the 1960s.

The accepted life cycle of a school is approximately forty (40) years of service. Consequently, BCPS was confronted with another unprecedented circumstance in the 1990s. The critical infrastructure of the bulk of the BCPS inventory was in need of major restoration/replacement work.

In 1997/98 the consultant firm of Perks-Reutter Associates inspected all schools. The intent of this report was to identify items and indicate whether they were in poor / fair / or good condition. This information was used to develop the scope of work for the elementary, special, and middle schools.

FY2010 Public School Construction Capital Improvement Program Guidelines

The following chart illustrates State funding eligibility based upon the age of an existing facility.

<u>Age Category</u>	<u>Project was Occupied or Placed in Service:</u>	<u>% of State Construction Cost</u>
40 years & older	On or before December 31, 1968	100%
31 – 39 years	On or after Jan. 1, 1969 through Dec. 31, 1977	85%
26 – 30 years	On or after Jan. 1, 1978 through Dec. 31, 1982	75%
21 – 25 years	On or after Jan. 1, 1983 through Dec. 31, 1987	65%
16 – 20 years	On or after Jan. 1, 1988 through Dec. 31, 1992	50%
0 - 15 years	On or after Jan. 1, 1993 to present	0%

* Information provided by the State of Maryland, Public School Construction Program

Perks-Reutter Associates Assessment Program

Executive Summary

In October 1997, the Board of Education approved a contract with Perks-Reutter Associates to perform a complete assessment of all Baltimore County Public Schools. The purpose of this assessment was to evaluate and to identify **immediate** (one to four years), **short term** (five to nine years), and **long term** (ten or more years) infrastructure needs for each school and to provide a tool for budgeting, planning, and managing each school's condition.

The proposed plan was intended to be complete in a ten year period and did not address educational program concerns, abatement activities, design cost, contingency, or construction phasing and scheduling.

Fiscal Expenditures To Date (\$1 billion)

Between 1998 and 2008, \$1,070,000,000 of capital funds was expended by Engineering and Construction on new schools, additions and renovation projects. These expenditures included partial renovations at elementary and special schools as well as more encompassing renovations at middle schools and new school construction. Even with everything that has been accomplished over the last ten years, considerable work remains to be done to bring all of our facilities into the 21st century. High school renovations are now underway with a cost projection of approximately one billion dollars (\$1,000,000,000)*. Staff is also in the process of reevaluating what other renovations are necessary to complete the elementary and special schools. The initial projected cost for these renovations may also exceed one billion dollars (\$1,000,000,000) and would include a modest program to incorporate the mechanical systems necessary to provide air conditioning, educational enhancements to support the instructional program, and the refurbishment or replacement of current infrastructure/structural issues.

* Based upon FY2009 dollars

Capital Projects Fund Expenditures

	(per CAFR Audited Statements)
1998	\$ 56,686,957
1999	\$ 57,781,173
2000	\$ 67,633,841
2001	\$ 112,160,296
2002	\$ 170,110,883
2003	\$ 109,213,128
2004	\$ 50,898,554
2005	\$ 56,682,135
2006	\$ 66,240,727
2007	\$ 156,876,000
2008	\$ 166,250,000
Total	\$ 1,070,533,694

Critical Infrastructure Components

Critical infrastructure incorporated in most school renovations include:

Structural Systems

- Roof System
- Wall System
- Floor System
- Ceiling System
- Windows - (comprehensive upgrade)
- Doors – (hardware only, comprehensive upgrade)

Mechanical Systems

- Heating System
 - Boilers
 - Unit Ventilators (heating only)
 - Heating Piping
- Ventilating System
 - Ventilators (AHU)
 - Exhaust Fans
 - Kitchen Hood/Makeup
- Air Conditioning System
 - Chillers
 - Individual Zoned Roof-top Air Conditioners and Heating Units
 - Health Suite
 - Administrative Offices
 - Computer Labs
 - Science Labs
 - Cooling Piping
- Mechanical Sub-systems
 - New Gas Service

Plumbing Systems

- Water Supply
 - Domestic Water Piping (interior)
 - Domestic Water Piping (exterior)
- Sanitary Sewer System

Electrical Systems

- Power System (comprehensive upgrade of power including switchgear and distribution)
 - New Service Exterior
 - New Gear/Power System
 - Generator (Natural Gas/Diesel)

- Lighting System
 - Exterior
 - Interior

Fire Safety

- Fire Alarm System
- Sprinklers

Conveying Systems

- Chair Lifts
- Elevator (installation, replacement or renovation of elevator system)

Miscellaneous Systems

- Telecommunications
 - Internal CCTV
 - Phones
 - Speaker System/PA
- Security Systems
 - Doors
 - Cameras and Servers
 - Card Reader
 - Door Mag Locks
 - Alarms
- ADA Systems
 - Chairlifts
 - Ramps
 - Bathrooms

Educational Program Enhancements *(Must be included in all Limited Renovation projects; these are improvements or enhancements to portions of the building that impact the delivery of the educational program for a large percentage of the school's population). Examples include:*

- Renovation/Updating of Science Rooms & Support Rooms
- Renovation/Updating of Math Rooms
- Renovation/Updating of Art Rooms
- Renovation/Updating of Music Rooms
- Renovation/Updating of Media Center & Support Rooms (Computer Labs)
- Renovation/Updating of Health Suite
- Renovation/Updating of Family Studies Rooms
- Renovation/Updating of 'Shop' or Career and Technology Education Rooms
- Renovation/Updating of Cafeteria Rooms
- Renovation/Updating of Technology Infrastructure to Enhance 21st Century Learning

Systemic Roof Replacement

A cyclic roof replacement program was initiated in the mid 1990s. The impending crisis in facilities was evident; a resolution to address roof system problems (leaks, mitigation of water damage, structural deterioration, etc.) could not be deferred any longer.

The current roofing program is modeled after the State of Maryland, Department of General Services (DGS) plan. Every school roof in BCPS is inspected twice per year, new roofs require a 20 year warranty, and inventory information is recorded in the Computerized Maintenance Management System (CMMS) database.

Strategic Initiatives Funding 2007

- Continue capital investment strategies
- Place greater emphasis on window replacement
- Improve response to schools through Computerized Maintenance Management System (CMMS)
- Continue to work aggressively with fiscal authorities to secure funding so that all students will be educated in school environments that are safe and conducive to learning
- Enhance BCPS indoor air quality program



Strategic Initiatives Funding 2008

- Continue capital investment strategies
- Continue implementation of IAQ *Tools for Schools* Program
- Continue building automation system (BAS)
- Continue boiler/burner preventive maintenance program
- Continue cyclic maintenance of building components



Department of Physical Facilities Environmental Services

Environmental Services deals with a variety of environmental concerns in schools, but none are quite as prominent as indoor air quality (IAQ). For this reason, significant resources have been dedicated to IAQ.

Although the school system had an IAQ program in place for many years, it was somewhat reactive and ad hoc. In 2000 a written protocol was developed to follow for environmental investigations and at the same time, attempted to tailor maintenance and operations procedures to be more conducive to a quality indoor environment. Then, in 2003, the Baltimore County Council passed a resolution recommending that an Environmental Assessment Committee be established for BCPS to evaluate the procedures that were in place to ensure a good indoor environment and make recommendations for improvement. As a result, a written IAQ Program was developed that incorporates a BCPS protocol for investigations, and adopts the United States Environmental Protection Agency (USEPA) Tools for Schools (TfS) program. The basic program has been modified to better fit the needs of BCPS, but modeled after the USEPA program. TfS is a self-help program that uses site based individuals to evaluate school problems and look for simple solutions. Teachers, the building operation supervisor and the school nurse are common members of the team for a school. The program began in 2005 by involving 40 schools in the program as a pilot project. Since then 40 additional schools have been included in the program each year. This school year, we are drafting the last group of schools into the program, and at that point we will have 100% participation. Participation in this program is intended to create an awareness of what can be done at the classroom level to help improve the environment in each school. Also, participants are more attuned to possible problems that arise and can alert Environmental Services before the problem becomes a crisis. BCPS has been very successful with the TfS program as exemplified by the recognition by the USEPA for our efforts with three awards, the Great Start Award, the Leadership Award, and the National Excellence Award. In addition BCPS was awarded the American Lung Association Distinguished Service Award for Clean Air.

The Offices of Maintenance and Grounds, and Operations have been proactive participants in the IAQ program. Rapid identification of potential problems and the direct involvement of repair technicians have served to prevent numerous major IAQ events.

Lastly, due to the success of the IAQ program more funds and effort have been directed toward preventive measures as opposed to cleanup. Much of our preventive work is aimed at reducing moisture in buildings, the most immediate cause for mold growth. In effect, there is a beneficial synergistic effect at work. That is, the more effort put into prevention, the less spent on cleanup and the more we have for further proactive work. The best way to illustrate this is to review the expenditures for the last several summers for mold cleanup. Summer is typically our worst time for mold and it is when the bulk of mitigation funding is expended. During the years 2004 – 2005, approximately \$500,000 was dedicated each year to mitigate environmental issues. With the implementation of a preventative program, expenditures were reduced to an average of \$55,000 per year from 2006 through 2008.

As the evidence suggests, the results are dramatic. With three summers of data to compare, the IAQ program is proving to be cost effective, and based upon the reduction in IAQ complaints, the program is operating in full support of the instructional programming.

Public School Construction Program Inspections

Inspectors from the Public School Construction Program (PSCP) inspect a portion of BCPS buildings every year. The inspections are currently on a six (6) year schedule to visit all schools and to provide a formal written report. The format for the facility inspections includes thirty-five (35) specific points, including but not limited to: roadways and parking lots, site appearance, roof conditions, plumbing and bathroom fixtures, fire and safety equipment, and electrical service equipment. Each component is given a number and the results are tallied for an overall rating. The ratings are; superior, good, adequate, not adequate, or poor. The Operations staff utilizes a similar inspection form to inspect approximately one half of all BCPS buildings annually.

**Baltimore County Public Schools
FY 2007 Maintenance Survey Results
Public School Construction Program**

School Name	Overall Rating	Date of Inspection
Battle Grove	Good	10/04/06
Battle Monument Special Ed.	Superior	10/03/06
Bear Creek Elementary	Adequate	10/04/06
Berkshire Elementary	Good	10/06/06
Carroll Manor Elementary	Good	09/28/06
Catonsville Alternative School	Good	09/29/06
Catonsville Elementary	Superior	10/03/06
Charlesmont Elementary	Good	09/27/06
Chase Elementary	Good	09/25/06
Cromwell Valley Elementary	Good	09/28/06
Deer Park Elementary	Good	09/27/06
Eastern Technical High	Adequate	10/11/06
Fifth District Elementary	Superior	10/13/06
Grange Elementary	Good	09/27/06
Harford Hills Elementary	Good	09/28/06
Hawthorne Elementary	Good	09/25/06
Lansdowne Elementary	Good	09/25/06
Loch Raven High	Good	10/04/06
Middlesex Elementary	Adequate	10/03/06
Old Court Middle	Good	10/11/06
Orems Elementary	Good	9/11/06
Overlea High	Adequate	10/10/06
Owings Mills Elementary	Superior	09/29/06
Patapsco High	Good	10/06/06
Perry Hall Middle	Adequate	09/22/06
Pinewood Elementary	Good	09/28/06
Powhatan Elementary	Good	10/12/06
Reisterstown Elementary	Good	09/29/06
Summit Park Elementary	Superior	10/12/06
Towson High	Good	10/10/06
Warren Elementary	Good	09/21/06
Wellwood Elementary	Good	09/26/06
Winand Elementary	Good	09/29/06

**Baltimore County Public Schools
FY 2008 Maintenance Survey Results
Public School Construction Program**

School Name	Overall Rating	Date of Inspection
Cedarmere Elementary	Good	11/01/07
Chatsworth Elementary	Good	11/01/07
Chesapeake High	Good	10/22/07
Cockeysville Middle	Good	11/02/07
Deep Creek Elementary	Good	10/22/07
Eastwood Primary	Good	10/25/07
Fort Garrison Elementary	Superior	10/17/07
Glenmar Elementary	Good	10/25/07
Golden Ring Middle	Good	10/26/07
Gunpowder Elementary	Good	10/26/07
Hampton Elementary	Good	10/30/07
Hereford Middle	Good	10/29/07
Hernwood Elementary	Adequate	10/17/07
Joppa View Elementary	Good	10/26/07
Lutherville Lab	Good	10/31/07
Maiden Choice Spec. Ed.	Good	10/23/07
Oakleigh Elementary	Good	10/16/07
Pleasant Plains Elementary	Good	11/02/07
Red House Run Elementary	Good	10/22/07
Relay Elementary	Good	10/23/07
Riderwood Elementary	Good	10/30/07
Ridge Ruxton Spec. Ed.	Superior	10/16/07
Ridgley Middle	Good	10/31/07
Woodbridge Elementary	Good	10/15/07
Woodlawn Middle	Good	10/18/07
Woodlawn High	Good	10/17/07

**Baltimore County Public Schools
FY 2007 Operations Survey Results**

School Name	Overall Rating	Date of Inspection
Arbutus Elementary	Good	1/20/2007
Baltimore Highlands Elementary	Good	1/20/2007
Battle Monument	Good	1/18/2007
Berkshire Elementary	Superior	1/26/2007
Campfield Center	Superior	1/18/2007
Carroll Manor Elementary	Good	1/18/2007
Carney Elementary	Good	1/19/2007
Carver Center for the Arts and Technology	Good	1/30/2007
Catonsville Elementary	Good	1/20/2007
Cedarmere Elementary	Superior	1/18/2007
Chadwick Elementary	Good	1/20/2007
Charlesmont Elementary	Good	1/18/2007
Chapel Hill Elementary	Good	1/25/2007
Church Lane Elementary	Good	1/22/2007
Colgate Elementary	Good	1/26/2007
Cromwell Valley Elementary Regional Magnet	Good	1/30/2007
Deep Creek Middle Magnet	Good	1/30/2007
Deer Park Middle Magnet	Good	1/18/2007
Dundalk Middle	Good	1/18/2007
Eastern Technical High	Adequate	1/19/2007
Eastwood Center	Good	2/01/2007
Elmwood Elementary	Good	1/22/2007
Franklin High School	Superior	1/18/2007
Fullerton Elementary	Good	1/25/2007
Glyndon Elementary	Good	1/24/2007
Golden Ring Middle	Good	1/26/2007
Gunpowder Elementary	Good	1/22/2007
Halstead Academy	Good	1/31/2007
Hampton Elementary	Good	1/31/2007
Hebbville Elementary	Adequate	1/20/2007
Harford Hills Elementary	Good	1/19/2007
Hawthorne Elementary	Good	2/01/2007
Hereford High	Good	1/31/2007
Hernwood Elementary	Good	1/22/2007
Joppa View Elementary	Good	1/25/2007
Kingsville Elementary	Good	1/25/2007
Lansdowne Middle	Good	1/21/2007
Loch Raven Academy	Adequate	1/17/2007
Lutherville Laboratory	Superior	2/08/2007
Maiden Choice School	Good	2/12/2007

**Baltimore County Public Schools
FY 2007 Operations Survey Results**

School Name	Overall Rating	Date of Inspection
Mars Estates Elementary	Good	1/24/2007
Martin Boulevard Elementary	Good	1/22/2007
Middle River Middle	Superior	1/18/2007
Milbrook Elementary	Superior	1/18/2007
Norwood Elementary	Good	2/01/2007
Oakleigh Elementary	Good	1/31/2007
Oliver Beach Elementary	Superior	1/25/2007
Orems Elementary	Good	1/26/2007
Owings Mills Elementary	Superior	1/18/2007
Overlea High	Good	1/19/2007
Parkville High	Adequate	1/19/2007
Parkville Middle	Good	1/19/2007
Perry Hall Elementary	Good	1/25/2007
Perry Hall High	Good	1/22/2007
Perry Hall Middle	Good	1/25/2007
Pikesville High	Good	1/18/2007
Pine Grove Elementary	Superior	1/18/2007
Pine Grove Middle	Good	1/19/2007
Pleasant Plains Elementary	Good	1/31/2007
Powhatan Elementary	Good	1/21/2007
Prettyboy Elementary	Good	1/31/2007
Randallstown High	Good	1/22/2007
Red House Run Elementary	Good	1/26/2007
Riderwood Elementary	Good	1/31/2007
Ridgely Middle	Good	1/31/2007
Riverview Elementary	Good	1/21/2007
Sandalwood Elementary	Good	1/30/2007
Scotts Branch Elementary	Good	1/22/2007
Seven Oaks Elementary	Good	1/22/2007
Shady Spring Elementary	Good	1/26/2007
Southwest Academy	Adequate	1/21/2007
Sparrows Point Middle / High	Good	1/24/2007
Stoneleigh Elementary	Good	1/31/2007
Summitt Park Elementary	Superior	1/18/2007
Timonium Elementary	Good	1/31/2007
Warren Elementary	Good	1/31/2007
Western School of Technology	Good	1/21/2007
Wellwood International	Superior	1/18/2007
Windsor Mill Middle	Superior	1/21/2007
Winfield Elementary	Good	2/12/2007
Woodbridge Elementary	Good	1/21/2007

**Baltimore County Public Schools
FY 2007 Operations Survey Results**

School Name	Overall Rating	Date of Inspection
Woodlawn High	Adequate	1/21/2007
Woodlawn Middle	Adequate	1/21/2007
Victory Villa Elementary	Good	1/22/2007
Villa Cresta Elementary	Good	1/31/2007

**Baltimore County Public Schools
FY 2008 Operations Survey Results**

School Name	Overall Rating	Date of Inspection
Arbutus Middle	Good	2/01/2008
Battle Grove Elementary	Good	1/22/2008
Bear Creek Elementary	Good	1/23/2008
Bedford Elementary	Good	1/26/2008
Bridge Center	Good	2/01/2008
Catonsville Alternative	Good	2/20/2008
Catonsville High	Adequate	2/07/2008
Catonsville Middle	Good	2/04/2008
Chase Elementary	Good	2/26/2008
Chatsworth Elementary	Superior	1/23/2008
Chesapeake High	Good	2/05/2008
Chesapeake Terrace Elementary	Good	3/05/2008
Cockeysville Grounds	Good	2/04/2008
Cockeysville Middle	Good	1/30/2008
Crossroads Center	Superior	1/30/2008
Deep Creek Elementary	Good	2/13/2008
Deer Park Elementary	Good	1/23/2008
Dulaney High	Good	1/25/2008
Dumbarton Middle	Good	2/01/2008
Dundalk Elementary	Good	2/20/2008
Dundalk High	Adequate	2/14/2008
Edgemere Elementary	Good	1/28/2008
Edmondson Heights Elementary	Good	2/09/2008
Essex Elementary	Good	1/29/2008
Featherbed Lane Elementary	Good	2/09/2008
Fifth District	Good	1/25/2008
Fort Garrison Elementary	Superior	1/28/2008
Franklin Elementary	Superior	1/23/2008
Franklin Middle	Superior	1/23/2008
General John Stricker Middle	Good	1/22/2008
Glenmar Elementary	Good	1/29/2008
Grange Elementary	Good	1/23/2008
Greenwood Offices	Good	2/01/2008
Halethorpe Elementary	Good	2/09/2008
Hereford Middle	Good	1/24/2008
Hillcrest Elementary	Good	2/11/2008
Holabird Middle	Superior	2/14/2008
Home and Hospital	Good	1/28/2008
Jacksonville Elementary	Good	1/28/2008
Johnnycake Elementary	Adequate	2/13/2008

**Baltimore County Public Schools
FY 2008 Operations Survey Results**

School Name	Overall Rating	Date of Inspection
Kenwood High	Good	1/29/2008
Lansdowne Elementary	Good	2/13/2008
Lansdowne High	Good	2/14/2008
Loch Raven High	Good	1/31/2008
Logan Elementary	Good	1/24/2008
McCormick Elementary	Good	1/25/2008
Meadowwood Center	Good	2/19/2008
Middleborough Elementary	Good	2/07/2008
Middlesex Elementary	Good	1/29/2008
Milford Mill Academy	Good	1/24/2008
New Town Elementary	Good	1/23/2008
New Town High	Superior	1/23/2008
Old Court Middle	Good	1/23/2008
Owings Mills High	Good	1/28/2008
Padonia Elementary	Good	1/24/2008
Patapsco High School	Good	1/29/2008
Pikesville Middle	Good	1/23/2008
Pinewood Elementary	Good	1/29/2008
Professional Development Center	Good	1/29/2008
Pot Spring Elementary	Good	1/30/2008
Randallstown Elementary	Good	1/25/2008
Reisterstown Elementary	Superior	1/23/2008
Relay Elementary	Good	2/19/2008
Ridge Ruxton	Good	2/01/2008
Rodgers Forge Elementary	Good	2/04/2008
Rosedale Center	Good	1/25/2008
Sandy Plains Elementary	Good	2/20/2008
Seneca Elementary	Good	2/11/2008
Seventh District Elementary	Good	1/22/2008
Sollers Point	Adequate	2/11/2008
Southwest Student Support Services	Good	2/20/2008
Sparks Elementary	Good	1/25/2008
Stemmers Run Middle	Adequate	1/17/2008
Sudbrook Middle Magnet	Good	1/28/2008
Sussex Elementary	Good	2/11/2008
Timber Grove Elementary	Good	1/23/2008
Timonium Office	Good	2/04/2008
Towson High	Good	2/01/2008
Westchester Elementary	Good	2/21/2008
Westowne Elementary	Adequate	2/24/2008

**Baltimore County Public Schools
FY 2008 Operations Survey Results**

School Name	Overall Rating	Date of Inspection
White Oak School	Good	2/04/2008
Winand Elementary	Good	1/23/2008
Woodholme Elementary	Superior	1/23/2008
Woodmoor Elementary	Adequate	2/25/2008

**Quantum Shift in Approach to
Refurbishing / Restoring Vintage Buildings**

High School Feasibility Studies

High School Feasibility Studies

The Perks-Reutter Study was completed in 1998. The study identified items as “poor” that required replacement/renovation over the next 0-5 years. The elementary schools, special schools, and middle schools had their infrastructure systems renovated based on the 1998 study. During the middle school renovations, the State approved a Limited Renovation (LR) Program for possible funding. The Limited Renovation Program requires the Local Education Agency (LEA) to replace/repair a minimum of five (5) systems along with making educational enhancements to the school. It is essential to evaluate the approach to renovate high schools.

In 2008, consultants were hired to inspect seven (7) high schools and prepare feasibility studies. The feasibility studies have:

- Investigated the infrastructure condition, including site assessment and accessibility of each school.
- Investigated possible educational enhancements at each school.
- Determined what type of work (boiler replacement, science room upgrading, lighting retrofits, etc.) that has been completed at each facility over the past 15 years.
- Prepared budgetary construction estimates for all proposed renovation work.
- Assisted facilities personnel with the capital budget preparation.

The high schools are being investigated (and feasibility studies prepared) on an age order (oldest to newest) basis. However, after review of the first seven high schools (Sollers Point Technical HS, Milford Mill Academy, Hereford HS, Kenwood HS, Parkville HS, Dundalk HS, and Franklin HS), it was evident that building conditions should serve as the primary component to determine the order for design development and renovation. For example, the BCPS FY2010 Capital Budget has been prepared based on the seven (7) High School Feasibility Studies. In doing so, the overall physical condition of the infrastructure has been used as the guide to prioritize each school. For this reason the FY 2010 budget was prepared with Sollers Point Technical HS, Milford Mill Academy, Dundalk HS, and Parkville HS, as top priorities in this specific order.

Over the next several months, additional consultants will be selected to begin investigations on the next set of five (5) to seven (7) high schools, by age order. The information provided from these studies along with the completed ones will be the key factor in developing future capital budgets.

**Pragmatic Approach to Revisit
Elementary, Middle, and Special Schools**

Air Conditioned Schools

Elementary, High, Middle, Special Education, and Alternative Schools 2007- 08	Area	Type	State Rated Cap.	FTE Enrl.	# +/- Cap.	Total/ Partial Magnet Status Y/N	Air Cond. Status Y/N	Year Opened	Sq. Ft.
Carroll Manor	C	EL	362	347	-15	N	N	1935	35,175
Cromwell Magnet	C	EL	411	432	21	Y	Y	1963	49,650
Fifth District	C	EL	274	277	3	N	N	1932	33,425
Halstead Academy	C	EL	565	506	-59	N	N	1962	39,325
Hampton	C	EL	307	376	69	N	N	1958	49,800
Jacksonville	C	EL	637	556	-81	N	Y	1994	75,672
Lutherville	C	EL	407	453	46	Y	N	1951	33,230
Oakleigh	C	EL	543	472	-71	N	N	1955	39,565
Padonia	C	EL	323	297	-26	N	Y	1968	46,960
Pinewood	C	EL	566	499	-67	N	Y	1966	40,370
Pleasant Plains	C	EL	509	492	-17	N	N	1958	59,505
Pot Spring	C	EL	477	541	64	N	N	1963	45,790
Prettyboy	C	EL	398	429	31	N	Y	1941	33,765
Riderwood	C	EL	463	512	49	N	Y	1965	51,145
Rodgers Forge	C	EL	396	624	228	N	Y	1951	37,395
Seventh District	C	EL	461	387	-74	N	Y	1969	13,405
Sparks	C	EL	410	517	107	N	Y	1998	54,800
Stoneleigh	C	EL	499	604	105	N	N	1930	22,410
Timonium	C	EL	405	425	20	N	N	1959	60,795
Villa Cresta	C	EL	632	520	-112	N	N	1952	28,787
Warren	C	EL	395	349	-46	N	Y	1971	54,790
Carver Center	C	HIGH	766	708	-58	Y	N	1949	46,995
Dulaney High	C	HIGH	1984	1925	-59	N	N	1964	184,790
Hereford High	C	HIGH	1230	1395	165	N	N	1953	102,060
Loch Raven High	C	HIGH	975	1098	123	N	Y	1972	190,600
Towson High	C	HIGH	1260	1442	182	Y	Y	1949	160,154
Cockeysville Middle	C	MID	1049	829	-220	N	Y	1967	126,140
Dumbarton Middle	C	MID	1114	983	-131	N	N	1956	149,455
Hereford Middle	C	MID	1123	1044	-79	N	N	1984	88,130
Loch Raven Acad.	C	MID	1082	576	-506	Y	N	1961	139,355
Ridgely Middle	C	MID	1082	1064	-18	N	N	1960	142,370
Ridge/Ruxton School	C	Spec Ed.	240	122	-118	N	Y	1962	40,790
White Oak School	C	Spec Ed.	410	123	-287	N	Y	1977	81,000
Rosedale Alt, center	NE	ALT	250	212	-38	N	N	1948	30,460
Carney	NE	EL	527	460	-67	N	N	1965	52,780
Chapel Hill	NE	EL	636	788	152	N	N	1962	42,870
Elmwood	NE	EL	519	477	-42	N	N	1958	53,280
Essex	NE	EL	471	442	-29	N	Y	1995	66,650
Fullerton	NE	EL	463	496	33	N	Y	1976	62,910
Glenmar	NE	EL	371	411	40	N	N	1957	58,000
Gunpowder	NE	EL	499	501	2	N	Y	1970	47,360
Harford Hills	NE	EL	323	343	20	N	N	1962	48,200
Joppa View	NE	EL	621	564	-57	N	N	1990	56,987

Elementary, High, Middle, Special Education, and Alternative Schools 2007- 08	Area	Type	State Rated Cap.	FTE Enrl.	# +/- Cap.	Total/ Partial Magnet Status Y/N	Air Cond. Status Y/N	Year Opened	Sq. Ft.
Kingsville	NE	EL	349	351	2	N	N	1954	40,095
Martin Boulevard	NE	EL	324	271	-53	N	Y	1999	54,947
McCormick	NE	EL	455	417	-38	N	Y	1971	54,450
Middlesex	NE	EL	534	494	-40	N	N	1956	52,000
Orems	NE	EL	291	309	18	N	N	1960	51,870
Perry Hall	NE	EL	516	542	26	N	N	1956	57,920
Pine Grove	NE	EL	526	441	-85	N	Y	1969	49,565
Red House Run	NE	EL	481	462	-19	N	Y	1966	48,500
Seven Oaks	NE	EL	425	376	-49	N	N	1992	56,987
Shady Spring	NE	EL	499	553	54	N	Y	1977	54,620
Victory Villa	NE	EL	370	299	-71	N	N	1943	38,805
Eastern Tech. High	NE	HIGH	1380	1236	-144	Y	Y	1970	136,915
Kenwood High	NE	HIGH	1527	1793	266	Y	N	1955	248,390
Overlea High	NE	HIGH	1273	1279	6	Y	N	1961	178,300
Parkville High	NE	HIGH	2037	1882	-155	Y	N	1958	202,215
Perry Hall High	NE	HIGH	2110	2321	211	N	Y	1967	178,960
Golden Ring Middle	NE	MID	901	699	-202	N	N	1931	43,800
Middle River Middle	NE	MID	1007	868	-139	N	N	1959	125,410
Parkville Middle	NE	MID	1089	1102	13	Y	N	1953	113,845
Perry Hall Middle	NE	MID	1643	1498	-145	N	Y*	1963	146,530
Pine Grove Middle	NE	MID	1241	1038	-203	N	Y	1974	150,190
Stemmers Run Mid.	NE	MID	1154	713	-441	N	N	1949	115,860
Bedford	NW	EL	309	307	-2	N	N	1962	44,030
Cedarmere	NW	EL	405	457	52	N	Y	1971	55,175
Chatsworth	NW	EL	414	384	-30	Y	Y	1974	76,085
Church Lane	NW	EL	476	481	5	Y	Y	1963	49,070
Deer Park	NW	EL	451	413	-38	N	Y	1970	52,500
Fort Garrison	NW	EL	431	398	-33	N	N	1961	49,555
Franklin	NW	EL	496	494	-2	N	N	1956	55,000
Glyndon	NW	EL	565	460	-105	N	Y	1978	54,420
Hernwood	NW	EL	398	450	52	N	Y	1967	37,970
Milbrook	NW	EL	319	346	27	N	Y	1967	43,518
New Town	NW	EL	697	661	-36	N	Y	2001	83,307
Owings Mills	NW	EL	699	648	-51	N	N	1926	20,775
Randallstown	NW	EL	398	394	-4	N	N	1908	8,050
Reisterstown	NW	EL	438	458	20	N	N	1963	41,545
Scotts Branch	NW	EL	511	482	-29	N	N	1960	54,640
Summit Park	NW	EL	336	352	16	N	Y	1966	38,995
Timber Grove	NW	EL	634	550	-84	N	Y	1968	52,343
Wellwood	NW	EL	455	438	-17	Y	N	1956	44,770
Winand	NW	EL	609	445	-164	N	Y	1966	38,495
Woodholme	NW	EL	676	676	0	N	Y	2005	82,837
Franklin High	NW	HIGH	1647	1591	-56	N	N	1960	132,625
Milford Mill Acad.	NW	HIGH	1465	1537	72	Y	N	1949	119,675
New Town High	NW	HIGH	1303	963	-340	N	Y	2003	209,609
Owings Mills High	NW	HIGH	1103	1086	-17	N	Y	1978	162,770
Pikesville High	NW	HIGH	1007	966	-41	N	N	1964	186,520

Elementary, High, Middle, Special Education, and Alternative Schools 2007- 08	Area	Type	State Rated Cap.	FTE Enrl.	# +/- Cap.	Total/ Partial Magnet Status Y/N	Air Cond. Status Y/N	Year Opened	Sq. Ft.
Randallstown High	NW	HIGH	1444	1272	-172	Y	Y	1969	186,825
Deer Park Middle	NW	MID	1368	1134	-234	Y	Y	1973	135,695
Franklin Middle	NW	MID	1422	1369	-53	N	N	1929	47,110
Old Court Middle	NW	MID	1082	552	-530	N	N	1966	149,315
Pikesville Middle	NW	MID	1070	917	-153	N	Y	1968	135,170
Sudbrook Mag. Mid.	NW	MID	1060	1004	-56	Y	N	1956	150,042
Battle Grove	SE	EL	377	304	-73	N	N	1959	56,540
Bear Creek	SE	EL	573	408	-165	N	N	1955	52,340
Berkshire	SE	EL	408	319	-89	N	N	1954	57,150
Charlesmont	SE	EL	426	335	-91	N	N	1962	58,900
Chase	SE	EL	393	312	-81	N	N	1939	20,870
Chesapeake Terrace	SE	EL	292	181	-111	N	Y	1930	18,570
Colgate	SE	EL	340	322	-18	N	N	1924	14,765
Deep Creek	SE	EL	368	425	57	N	N	1963	37,315
Dundalk	SE	EL	590	577	-13	N	N	1925	30,280
Eastwood	SE	EL	217	170	-47	Y	N	1963	36,855
Edgemere	SE	EL	523	518	-5	N	Y	1998	66,650
Grange	SE	EL	477	346	-131	N	N	1960	55,165
Hawthorne	SE	EL	587	515	-72	N	N	1954	55,240
Logan	SE	EL	517	493	-24	N	Y	1968	63,190
Mars Estates	SE	EL	431	370	-61	N	Y	1950	37,965
Middleborough	SE	EL	291	277	-14	N	N	1960	45,835
Norwood	SE	EL	509	623	114	N	N	1957	53,245
Oliver Beach	SE	EL	265	263	-2	N	Y	1981	50,400
Sandalwood	SE	EL	542	453	-89	N	Y	1971	50,500
Sandy Plains	SE	EL	677	515	-162	N	Y	1966	72,250
Seneca	SE	EL	409	388	-21	N	Y	1966	47,175
Sussex	SE	EL	380	327	-53	N	N	1955	55,075
Chesapeake High	SE	HIGH	1083	1026	-57	Y	Y	1977	207,500
Dundalk High	SE	HIGH	1538	1238	-300	N	N	1959	193,015
Patapsco High	SE	HIGH	1302	1513	211	Y	N	1963	156,275
Sparrows Pt. High	SE	HIGH	850	803	-47	Y	Y*	1956	82,025
Deep Creek Middle	SE	MID	1113	844	-269	Y	N	1963	145,200
Dundalk Middle	SE	MID	900	434	-466	N	Y	1946	95,860
Gen. Stricker Middle	SE	MID	1249	790	-459	N	Y	1968	169,555
Holabird Middle	SE	MID	1028	670	-358	N	N	1961	124,525
Sparrows Point Mid.	SE	MID	615	481	-134	N	Y*	1956	82,025
Sollers Point Tech Mag	SE	OTHER	725	NA	NA	Y	N	1948	67,229
Battle Monument Sp	SE	Spec Ed.	270	49	-221	N	Y	1962	36,560
Catonsville Alt. Center	SW	ALT	100	41	-59	N	N	1958	22,095
Arbutus	SW	EL	405	298	-107	N	N	1925	11,770
Baltimore Highlands	SW	EL	585	493	-92	N	N	1960	39,570
Catonsville	SW	EL	405	368	-37	N	N	1910	32,820
Chadwick	SW	EL	408	402	-6	N	Y	1966	39,525
Dogwood	SW	EL	503	484	-19	N	Y	2000	66,984
Edmondson Heights	SW	EL	545	550	5	N	N	1957	54,640

Elementary, High, Middle, Special Education, and Alternative Schools 2007- 08	Area	Type	State Rated Cap.	FTE Enrl.	# +/- Cap.	Total/ Partial Magnet Status Y/N	Air Cond. Status Y/N	Year Opened	Sq. Ft.
Featherbed Lane	SW	EL	716	686	-30	N	N	1958	56,360
Halethorpe	SW	EL	389	364	-25	N	Y	1976	41,435
Hebbville	SW	EL	540	447	-93	N	N	1961	54,280
Hillcrest	SW	EL	542	649	107	N	Y	1968	47,270
Johnnycake	SW	EL	559	567	8	N	N	1959	53,675
Lansdowne	SW	EL	313	354	41	N	N	1965	50,985
Powhatan	SW	EL	313	324	11	N	Y	1966	44,555
Relay	SW	EL	428	428	0	N	Y	1965	37,710
Riverview	SW	EL	572	460	-112	N	N	1957	43,940
Westchester	SW	EL	499	499	0	N	Y	1998	66,690
Westowne	SW	EL	468	483	15	N	N	1951	31,650
Winfield	SW	EL	498	424	-74	N	Y	1966	40,226
Woodbridge	SW	EL	392	372	-20	N	Y	1974	53,870
Woodmoor	SW	EL	631	511	-120	N	N	1956	56,245
Catonsville High	SW	HIGH	1685	1708	23	N	N	1954	154,500
Lansdowne High	SW	HIGH	1420	1317	-103	Y	N	1963	149,610
Western Tech.	SW	HIGH	1009	936	-73	Y	Y	1970	59,860
Woodlawn High	SW	HIGH	2129	1881	-248	Y	N	1961	195,390
Arbutus Middle	SW	MID	1079	820	-259	N	N	1958	138,600
Catonsville Middle	SW	MID	593	685	92	N	Y*	1963	44,615
Lansdowne Middle	SW	MID	975	698	-277	Y	Y	1971	120,700
Southwest Academy	SW	MID	1102	806	-296	Y	N	1960	136,000
Windsor Mill Middle	SW	MID	720	601	-119	N	Y	2006	116,648
Woodlawn Middle	SW	MID	1015	687	-328	N	Y	1962	120,260
Maiden Choice	SW	Spec Ed.	130	105	-25	N	Y	1951	26,080

Note: *Yes for the start of the 2008-2009 school year

Note: A/C listing does not account for schools where portions of the building are served by air conditioning

Air Conditioning as Part of the School Infrastructure

Air conditioning is defined as a method of filtering air and regulating its humidity and temperature in buildings, rooms, etc.

In order to retrofit existing school facilities with air conditioning equipment, the following information is needed:

Site Specific Survey / Design Development

Approximately one half of school facilities in Baltimore County are equipped with cooling systems. In consideration of the minimal work that was completed on schools included in the first phase of the multiple systemic renovation in the late 1990s, the infrastructure (plumbing, electrical, structural) is not in place in all schools to accommodate air conditioning.

As each building is surveyed to determine the status of the existing infrastructure, the following elements must be included in the design development:

- Temperature
- Humidity
- Indoor Air Quality (outside air ventilation)
- Energy usage
- First cost
- Operating cost (serviceability and maintenance)
- Acoustic issues
- Localized design conditions

Educational Areas Affected

In order to support the delivery of the instructional programs, special focus should be directed to the following educational spaces:

- Classrooms
- Gymnasiums
- Administrative Areas
- Health Suites
- Cafeteria and Auditoriums
- Science Classrooms
- Computer Classrooms
- School Stores
- Technology Education Laboratories
- Locker Rooms
- Family Studies Rooms

Equipment Determination

The building envelope, current code requirements, cooling capacity demand, architectural modifications, and mechanical/electrical evaluations will determine the type of cooling system and projected cost.

The following are mechanical systems identified to provide HVAC to K-12 school buildings with regards to the climate in our area. Each individual existing heating and ventilating system in schools now must be reviewed so that the proper cooling system may be added.

Recommendations by Climate Zone⁵

Climate Zone 4

- Packaged DX (direct expansion) rooftops or split systems
- Water source heat pumps (including ground source)
- Unit ventilator and Chiller system (2-pipe/4-pipe)
- Fan coil and Chiller system (2-pipe/4-pipe)
- Packaged rooftop VAV (variable air volume) system
- VAV and Chiller system

⁵ ASHRAE “Advanced Energy Design Guide for K-12 School Buildings

Executive Proposals

Executive Proposals

- **Continuation of an aggressive capital program to address critical infrastructure in schools (electrical, plumbing, roof systems, window systems, boilers, etc.)**
- **Expansion of educational enhancements incorporated into all school renovation projects**
- **Implementation of a program to complete school facility assessments in order to establish priority action for renovations at the elementary level**
- **Continuation of a comprehensive maintenance program**
- **Continuation of support for the Operations preventative maintenance program**
- **Continuation of a planned new school construction program**
- **Inclusion of the study of air conditioning for the possible inclusion in the renovation program at the high school level**



Appendix

Pictures Depict – Before / After Pictures Illustrate Advancement
Section 400 Systemic Renovations
State Maintenance Manual Guideline
Procedures Manual for Professional Services - DGS
Rule 6303 – Instruction: Schedules

Office of Grounds

Parkville High and Villa Cresta Elementary Schools

Parkville High
Parking Lot Needing
Repair



Villa Cresta Elementary
Parking Lot After
Repair



Logan Elementary and Joppa View Elementary Schools

Logan Elementary
Damaged Slide



Joppa View
Elementary
Replaced Slide



Johnnycake Elementary and Franklin High Schools

Johnnycake Elementary
Court Needing Repair



Franklin High
After Replacement



Owings Mills High and Overlea High Schools

Owings Mills High
Track Needing Repair



Overlea High
Track After
Replacement



Office of Operations

Dundalk Middle School Library



Essex Elementary School Multipurpose Room



Woodlawn High School Cafeteria



Sparks Elementary School Center Hallway



Milford Mill Academy Classroom



Office of Maintenance

Middle River Middle School Replaced Hot Water Tank



Hereford High School Electrical Service Repair



White Oak School

Before Lighting Retrofit
and Painting



After Lighting Retrofit
and Painting



Chase Elementary School

Lavatory Stall Doors
Needing Repair



Lavatory Stall Doors
Replaced



Eastern Technical High School

Intercom Repairs



Pleasant Plains Elementary School

Sprinkler Alarm Repair



Milford Mill Academy

Brick Repointing



Hereford Middle School

Roof Leak



Overlea High School

Water Main Break



Office of Engineering and Construction

Southwest Academy

Pre-Existing Window
System



New Window System



Glyndon Elementary and Logan Elementary Schools

Glyndon Elementary
Old Boiler



Logan Elementary
New Boiler



Cockeysville Middle School

Pre-Existing Roof



New Roof



Kenwood High School Addition

Exterior



Interior



Vincent Farm Elementary School

Exterior



Interior



SECTION

400

SYSTEMIC RENOVATIONS

Systemic renovations are renovations of specific building systems in a school facility. This type of renovation is to prolong the life of a building by renovating those parts of a facility having the greatest need without disturbing the total structure. This section will explain the procedure to be followed through this type of renovation.

401 SYSTEMIC RENOVATION PROJECTS

401.1 DEFINITION

A systemic renovation shall be defined for the purposes of this section as the repair or replacement of a major system of a properly maintained facility thereby extending the useful life of the facility or component thereof for a minimum of fifteen (15) years.

401.2 CATEGORIES OF SYSTEMIC RENOVATION PROJECTS

A. Structural

The replacement or renovation of roofs, wall systems, floor, or ceiling systems.

B. Mechanical

The replacement or renovation of heating, ventilating, and air conditioning systems, or mechanical sub-systems.

C. Plumbing

The replacement or renovation of water supply and sanitary systems.

D. Electrical

The replacement or renovation of an electrical system, including the switchgear and distribution system.

E. Fire Safety

The installation, replacement, or renovation of a fire safety system, including sprinklers, fire alarm, and fire detection systems.

F. Conveying Systems

The installation, replacement, or renovation of an elevator system.

401.3 PROJECT ELIGIBILITY

- A. Systemic renovation projects must extend the life of the facility or component at least 15 years.**
- B. Total project costs below \$100,000 are not eligible. See exception in E. below.**

- C. Combining systemic renovations within a building system category, each costing less than \$100,000 but in combination costing over \$100,000 would not be eligible for State funding except in special cases where other systemic renovations are necessary for supporting the primary renovations.
- D. Combining systemic renovations by consolidating work from more than one building system category with each category costing less than \$100,000 but in combination costing over \$100,000 would not be eligible for State funding.
- E. Small systemic renovation projects costing less than \$100,000 but more than \$50,000 are eligible. This fund source could only be available for a jurisdiction that did not have any requests for systemic projects exceeding \$100,000 in estimated costs.
- F. State funds shall be used only for contractual construction work. Costs for design, consultant fees, or LEA salaries shall not be eligible.
- G. If a school building is renovated through the PSCP within 15 years of completion of a systemic renovation project, the maximum State construction allocation for the renovation of the building shall be adjusted to account for the State's previous systemic renovation allocation(s).
- H. If a school building or component is less than 16 years old, it is not eligible for State funding.
- I. If a school building was approved for renovations through the PSCP prior to January 1, 1987, and the building or component is over 16 years of age and was not included in the renovation work, the work will be considered eligible for State funding.
- J. If a school building was approved for renovations through the PSCP after January 1, 1987 and a building component(s) were not included in the State funded project, the work on these components will not be eligible until 16 years after the completion of the renovation project.
- K. If the building ceases to be used for an educational purpose, the county will be responsible for assuming the outstanding bond debt remaining on the systemic renovation project.

401.4 SYSTEMIC RENOVATION REQUESTS

- A. The eligible cost of an approved systemic renovation project shall be shared by the State and the LEA based upon the State/local shared cost formula.
- B. Upon determination of need to renovate a system within a school, the LEA will submit a request to the IAC as part of the annual and five-year public school capital improvement program. The request shall be supported by fully executed copies of forms 102.2 and 102.3 as described in sections 102.3 and 102.4.

- C. A maximum State allocation will be established when the systemic renovation project is approved by the IAC and the BPW.

401.5 PROJECT DESIGN AND SUBMISSIONS

- A. The following information shall be used in preparing the submissions of documents for all approved systemic renovation projects. The submission of documents shall be done in two stages: the Design Development Submission and the Construction Document Submission (ready for bidding). The documents shall be prepared by a registered architect or engineer, the LEA's in-house design team, or a qualified consultant. The documents should not be proprietary and must be prepared to encourage competition.

B. Design Development Submission

This submission shall follow the requirements for the Design Development Submission described in Section 302. Complete the applicable portions of IAC/PSCP Form 302.1 (Design Development Document Submission) and Form 302.5 (Cost Estimate Summary and Worksheets) for each project. The submission should be in sufficient detail that the scope of the project can be easily understood, but not detailed to the level that any changes suggested or required would necessitate a great amount of work and time to modify the documents. Responses will generally be provided within 10 working days.

Send or deliver two (2) complete sets to:

Department of General Services
Office of Engineering and Construction
Administrator for Public School Construction
301 West Preston Street, Room 1405
Baltimore, Maryland 21201

C. Construction Document Submission

This submission shall follow the requirements for the Construction Document Submission described in Section 303. Complete the applicable portions of IAC/PSCP Forms 302.5 (Cost Estimate Summary and Worksheets) and Form 303.1 (Construction Documents Submission) for each project. The bidding documents shall include the local board of education's minority business enterprise procedures. Responses will generally be provided within 10 working days.

1. Send or deliver two (2) complete sets to:

Department of General Services
Office of Engineering and Construction
Administrator for Public School Construction
301 West Preston Street, Room 1405
Baltimore, Maryland 21201

and

2. Send or deliver one (1) complete set to:

Public School Construction Program
200 West Baltimore Street
Baltimore, Maryland 21201

- D. Incomplete submissions, drawings or documents which reflect a lack of coordination and are not ready for bid will not be reviewed.
- E. Projects shall not be released for bidding until authorized by the IAC.
- F. Two copies of any and all addendums issued by the LEA shall be submitted to the IAC (1 copy to 200 West Baltimore Street and 1 copy to 301 West Preston Street) at the time of issuance to the contractors.
- G. Bidding/Award of Contract
- After bidding authorization is granted, the project can be bid. Submit Form 303.3 (Approval of Construction Contract Award) and other information as required and described in Section 303.3 for the approval of the award of the contract by the IAC. Following notification of approval of contract award, the LEA may enter into the contract.

GUIDELINES FOR MAINTENANCE OF PUBLIC SCHOOL FACILITIES IN MARYLAND

**Interagency Committee on School Construction
May 30, 2008**

The Interagency Committee on School Construction (IAC)

Dr. Nancy S. Grasmick, State Superintendent of Schools, Chair
Mr. Richard E. Hall, Secretary, Maryland Department of Planning
Mr. Alvin C. Collins, Secretary, Department of General Services
Mr. Timothy Maloney, Appointee, President of the Senate
Mr. Fred Puddester, Appointee, Speaker of the House

The Public School Construction Program (PSCP)

Dr. David Lever, Executive Director
Ms. Joan Schaefer, Deputy Director
Mr. Donn Grove, Maintenance Inspector
Mr. Anthony Lassiter, Maintenance Inspector

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Section I

Types of Facility Maintenance Programs

The Maryland Consolidated Capital Loan Bill of 2007 (HB 51) requires the Interagency Committee on School Construction (IAC) to develop guidelines for the maintenance of public school facilities in Maryland. Since the summer of 2005, the IAC and the Public School Construction Program (PSCP), the State agency charged with implementation of school construction policies and management of State funding for school construction projects, has placed a special emphasis on the maintenance of public school facilities. Good maintenance of schools protects the substantial investment that the State and the local governments have made in capital improvements; just as important, it ensures that the occupants of school buildings will be allowed to carry out their important tasks of teaching and learning in environments that are safe, healthy, and reliable.

This manual, the product of research conducted by the PSCP Maintenance Inspectors, is a contribution to the continuing effort to improve Maryland's public schools.

1.a Introduction

What is facility maintenance and why is it performed? Webster's New College Dictionary defines maintenance as "*the upkeep of property or equipment*". This definition implies that maintenance should include actions to prevent a device or component from failing, or to correct the normal degradation of equipment and building systems in order to keep them in proper working condition. In both the private and governmental sectors, maintenance too often consists of the repair of equipment or systems after failure has already occurred. Information obtained over the past decade indicates that most private and governmental facility owners do not expend the necessary resources to maintain equipment in proper working order. Rather, these organizations wait for equipment failure to occur and then take whatever actions are necessary to repair or replace the equipment.

All equipment has associated with it a predefined life expectancy or operational life. For example, a specific piece of equipment may be designed to operate at full design load for 5,000 hours and may be designed to go through 15,000 start/stop cycles. Most equipment requires periodic maintenance during its design life. Belts need adjustment, alignment and balancing needs to be performed, proper lubrication on rotating equipment is required, and so on. Certain components may need replacement, e.g., a wheel bearing on a motor vehicle, to ensure that the main piece of equipment lasts for its design life. Whenever we fail to perform maintenance activities intended by the design manufacturer, we shorten the operating life of the equipment. Equipment that has been well maintained will generally also run more efficiently, resulting in energy savings reflected within the operating budget.

More than any other single individual, the principal of a public school establishes the standards that are reflected in teacher attitudes, student behavior, how the school is viewed by the community, and the physical condition of the facility. Public schools rely heavily on the principal to act as the on-site manager who oversees the daily operation of the maintenance and custodial staff as well as the upkeep and the condition of the building and its components. The principal should maintain a good relationship with the community, keep community members abreast of ongoing issues at the school, and inform them how they can assist with facility issues as well as other matters. The principal should have regular contact with the central office with regards to building-related issues, and must possess a sense of ownership regarding all aspects of the building and staff.

For the purposes of this report, the following items are *not* included in maintenance:

- Major repairs;
- Alterations;
- Renovations;
- Grounds work;
- Vehicle or grounds equipment repairs;
- Supervision of work being performed.

Over the past 30 years, different approaches to how maintenance can be performed to ensure that a facility will reach or exceed its design life have been developed in the United States. As alternatives to a *reactive maintenance* approach, in which maintenance is performed only after a piece of equipment or building system fails, *preventive maintenance* and *predictive maintenance* are programs that should be considered.

1.b Reactive Maintenance

Advantages
<ul style="list-style-type: none">• Low Initial Cost• Smaller Staff
Disadvantages
<ul style="list-style-type: none">• Risk that facilities will become inoperable, without prior warning• Increased cost due to unplanned downtime• Increased labor cost, especially if overtime is necessary• Cost involved with repair or replacement of equipment• Possible secondary equipment or process damaged during failure• Inefficient use of staffing resources

Reactive maintenance is basically the “*run it till it breaks*” maintenance approach. No actions or efforts are taken to maintain the equipment or building system as the designer had originally intended in order to ensure that its design life is reached. As noted above, this is still the predominant mode of operation in the United States. A case study by (Piotrowski) breaks down the actions taken in the average maintenance program as follows:

- Reactive: More than 55%
- Preventive: 31%
- Predictive: 18%
- Other: 2%

According to this study, the majority of maintenance resources and activities applied to an average facility are still reactive.

Reactive maintenance can be viewed as a double-edged sword. With new equipment, we can expect minimal incidents of failure. If our maintenance program is purely reactive, we will not expend manpower dollars or incur capital costs before an item breaks. Since we do not see any associated maintenance cost in the meantime, we can consider that we are saving money during this period. In reality, during this time we are really obligating ourselves to greater expense than under a different maintenance approach, because we are shortening the life of the equipment, resulting in the eventual need for more frequent, more intensive, and more costly replacement. The labor cost associated with this repair will likely be higher than normal because the failure will require more extensive repairs than if the equipment had not been run to failure. If critical equipment fails during off hours or close to the end of a normal work day and needs to be put back on line immediately, emergency overtime expenditures will be required. Since we run equipment to failure, a large inventory of materials and parts must be kept on hand, a significant cost factor. These costs would not have been necessary had the maintenance program been proactive from the beginning.

Most important, if the equipment fails during the hours of school operation, the continuity of the educational program may be jeopardized as students and staff must be relocated, alternative measures are

put in place to keep the building in operational condition, or, in the worst instance, the program is temporarily halted while repairs are in progress. The health and safety of building occupants may be jeopardized if the equipment failure affects the electrical, lighting, egress and mobility, or ventilation systems. Among the other liabilities noted, the potential dissatisfaction of the community at the closure of an educational program on even a temporary basis should be taken into account. These are costs and risks that would be minimized under the maintenance programs described below.

1.c Preventive Maintenance

Preventive maintenance can be defined as follows: Actions performed on a regular schedule to detect, prevent, or mitigate deterioration of a component or system in order to sustain or extend its useful life by reducing wear to an acceptable level. Typical preventive maintenance activities include lubrication of

Advantages

- Cost effective in many capital intensive processes
- Allows for the flexible adjustment of maintenance activities
- Increased component life cycle
- Energy Savings
- Reduced equipment or process failure.
- Estimated 12%-18% cost savings over reactive maintenance programs

Disadvantages

- Catastrophic failures cannot be entirely eliminated
- Labor intensive
- May include performance of unneeded maintenance
- Potential for incidental damage to components in conducting maintenance activities that are not needed

parts, filter changes in mechanical equipment, routine visual inspections of roofs and drains, and infrared inspection of electrical components.

The U.S. Navy pioneered preventive maintenance as a means to increase the reliability of their vessels (Piotrowski). By expending resources to conduct maintenance activities intended by the equipment designer, equipment life is extended and reliability is increased. In addition, operating and capital funds are saved compared to a program that only uses reactive maintenance. One study indicates that these savings can amount to as much as 12%-18% on average. Depending on current maintenance practices for the facility, the reliability of present equipment, and the implications if a facility must be closed due to a maintenance failure, there is little doubt that many facilities that are purely reliant on reactive maintenance could save more than 18% by instituting a

proper preventive maintenance program.

While preventive maintenance is not as optimal as the predictive maintenance program described below, it does have several advantages over a purely reactive program. By performing preventive maintenance as the equipment designer envisioned, the life of the equipment will approach or exceed the designed life expectancy, barring any unforeseen events. While all catastrophic equipment failures cannot be entirely eliminated, the number of failures will decrease. Extending the useful life of equipment and minimizing equipment failures both translate into maintenance and capital cost savings.

1.d Predictive Maintenance

Predictive maintenance can be defined as follows: A process of investigation and measurement to detect the onset of equipment or system degradation, thereby allowing stressors to be eliminated or controlled before they cause significant deterioration in the physical state of the components. The results of these investigations will indicate the current and future capability of the equipment or system.

Predictive maintenance differs from preventive maintenance in that it bases maintenance needs on the actual condition of the equipment or building system rather than on a pre-set schedule. Preventive maintenance is time based, with activities such as changing lubricant determined by calendar time or equipment run time. For example, when car owners change the oil in their vehicles every three months, the activity is based on calendar time; if they change it every 3,000-5,000 miles traveled, the activity is based on the equipment run time. In both scenarios, no concern is given to the actual condition and performance capability of the oil. This methodology would be analogous to carrying out a preventive maintenance task in a school facility.

If, however, the operator of the motor vehicle discounted the run time and had the oil analyzed at regular intervals to determine its actual condition and lubrication properties, the oil change might be extended to 10,000 miles. This predictive maintenance approach defines maintenance tasks based on actual and quantifiable material and equipment conditions.

The tests and inspections used in a predictive maintenance program may include vibration analysis, thermographs, x-ray or acoustic systems. For example, tests may be conducted to locate thinning piping, fractures or excessive vibration, all of which are indicative of maintenance requirements.

Advantages
<ul style="list-style-type: none">• Increased component operational life/sustainability• Allows for preemptive corrective actions• Decrease in equipment or process downtime• Better product quality• Improved worker and environmental safety• Energy Savings• Estimate 8%-12% cost savings over preventive maintenance program
Disadvantages
<ul style="list-style-type: none">• Increased investment in diagnostic equipment• Increased investment in staff training

The advantages of predictive maintenance are many. A well orchestrated predictive maintenance program will all but eliminate catastrophic equipment failures. Maintenance activities can be scheduled to minimize or completely avoid overtime costs, to minimize inventory and parts orders to only those that are required, and to support future maintenance needs well in advance. The operation of the equipment can be optimized, saving energy costs and increasing plant reliability. One study has estimated that a properly functioning predictive maintenance program can provide a savings of 8%-12% over a program utilizing preventive maintenance alone, (Piotrowski, FEMP). Depending on a facility's reliance on reactive maintenance and its material condition, predictive maintenance could achieve savings opportunities exceeding 30%-40% over a reactive maintenance program. Independent

surveys indicate the following industrial average savings result from initiation of a functional predictive maintenance program:

- Return on investment: 10 times
- Reduction in maintenance costs: 25-30%
- Elimination of breakdowns: 70-75%
- Reduction in downtime: 35-45%

However, it is expensive to initiate a predictive maintenance program . Much of the investigative equipment that is needed requires an initial cost in excess of \$50,000.00. Since personnel must exercise greater judgment and discretion than in a preventive maintenance program, training of in-plant personnel to effectively utilize predictive maintenance technologies will require considerable funding. Program success will require an understanding of the principles of predictive maintenance and a firm commitment to make the program work by all facility organizations and management.

1.e Corrective Maintenance and Minor Repairs

Corrective maintenance and minor facility repairs are related to reactive maintenance, preventive maintenance, and predictive maintenance:

- **Corrective maintenance** addresses deficiencies that inevitably result from unforeseen events, however diligently a preventive maintenance program is conducted: vandalism, lightning strikes, hail, flooding, etc. Deficiency items are typically low in cost to correct and are normally accomplished through the annual operation and maintenance (O&M) budget. Corrective maintenance excludes activities that expand the capacity of an asset, or otherwise upgrade the asset to serve needs greater than, or different from, those originally intended.
- **Minor repairs** address small alterations needed to improve the suitability of a facility for its current and intended use. These actions could include painting, carpet installation, lighting upgrade, construction of a small partition, etc., all restricted to a few spaces and not requiring capital funding. Minor repairs are typically carried out by in-house maintenance personnel, though outside contractors may be required. Minor repairs do not normally require the involvement of architectural/engineering analysis and design before work begins.

1.f Summary

Irrespective of the maintenance practice adopted, a school system must dedicate personnel and funding that are equal to the program necessities required to carry out their mission of good building performance and upkeep. Due to fluctuating budgets, our school systems face a common problem in finding and retaining dedicated and qualified personnel. Funding and budgetary restraints must be resolved at the local levels if our buildings are to operate successfully for their anticipated life terms.

References:

Note: The references and resources provided throughout this report are not considered to be all-inclusive. The listed organizations are not endorsed by the authors of this guide and are provided for information only.

American School and University Magazine, "Coming Up Short" (35th Annual M&O Cost Study, April, 2006) Pages: 25, 26, 29, 30, and 32. Website: <http://asumag.com/2006MOSchool.pdf>

Federal Energy Management Program (FEMP), *O&M Best Practices Guide* release 2.0, A Guide to Achieving Operational Efficiency, July 2004 issue, Chapter 5, Product of the FEMP O&M Center of Excellence, Website: www1.eere.energy.gov

Piotrowski, J.; April 2, 2001, *Pro-Active Maintenance for Pumps*. Archives, February 2001, Pump-Zone.com.

The documents below were used by J. Piotrowski in the above-referenced study:

Higgins, Lindley R., Dale P. Brautigam, and R. Keith Mobley (Editor), *Maintenance Engineering Handbook* (McGraw Hill Text, 5th Edition: September 1994)

Williams, John H., Alan Davies, and Paul R. Drake, *Condition-Based Maintenance and Machine Diagnostics* (Chapman & Hall: October 1994)

Palmer, Richard D. (Doc), *Maintenance Planning and Scheduling Handbook* (McGraw Hill: March 29, 1999)

Patton, Joseph D., Jr., *Maintainability and Maintenance Management* (Instrument Society of America, 3rd Revision: February 1994)

Moubray, John, *Reliability-Centered Maintenance* (Industrial Press, 2nd Edition: April 1997)

Smith, Anthony M., *Reliability-Centered Maintenance* (McGraw Hill: September 1992)

Section II

Task Allocations for Maintenance Staff

2.a Introduction

Proper resources are critical to a successful maintenance program, and none are more important than the number and the skill levels of maintenance personnel. It is essential to determine the proper number of personnel that are needed in each area of work in order to properly distribute responsibilities and ensure reliable performance of maintenance tasks. This section is based on a study conducted by Engineering Associates, Inc. of Atlanta, Georgia, in Fiscal Year 2000 for the purpose of properly structuring and staffing the maintenance program of Frederick County Public Schools, a school district in western Maryland that has experienced rapid growth. This firm has since closed its doors and no further reference information is available.

2.b Cross Training

Cross training, in which in-house personnel are trained in a variety of maintenance tasks, allows for continuous coverage of facility issues at all times. Where non-union shops are in place, plumbers, electricians, HVAC (heating, ventilation and air-conditioning) mechanics, roofers, and carpenters can be cross trained into other shops so that at no time is there a shortage of personnel when emergencies arise and coverage is necessary. Through cross-training, school-based custodial personnel will be capable of making minor repairs and will be equipped and available to respond to emergencies, such as turning water off in cases of flooding and shutting off power at equipment and in the building in order to reduce damage until trained personnel can respond. On-site custodial personnel should not be responsible for specialized preventive maintenance activities such as cleaning cooling towers, cleaning and servicing boilers, repairing electrical equipment, or servicing high pressure plumbing items unless they have been properly trained and are deemed qualified to perform these types of repairs or maintenance.

Where union shops are in place, cross training and out-of-trade-work are generally prevented by union rules unless management specifically creates this type of staff position.

2.c Task Allocations

The study referenced in Section 2.a was performed in a county that utilizes a non-union shop, therefore cross-training of specialized individuals was performed and each mechanic was typically assigned to 60,000 square feet of facility space. However, this was for maintenance only, not for building alterations or requested replacements or changes.

As new schools are being constructed and older schools are expanded through additions, manpower allocations must increase to properly maintain the additional educational space. Additional space is often not regarded as a rationale to increase the funding for maintenance, creating another burden to an existing staff shortage.

Reference: *Edward Haberly*, Supervisor of Maintenance, Frederick County Public Schools, Facilities Services Division

Section III

Training Best Practices

3.a Introduction

The purpose of staff training is to orient new employees to their responsibilities, as well as to indoctrinate them to work in a controlled environment in which the organization has instilled its own operational procedures and work ethics. Orientation procedures should include safety training and instruction how to deal with ongoing changes, and should provide a stimulating experience to people who perform repetitive tasks, thereby improving staff morale and retention rates. This section will address training of new employees as well as ongoing training and professional development of existing employees.

3.b Newly Hired Employees

In order to explain the job specifics and tasks for which they were engaged, newly hired personnel should receive the following types of training as soon as possible after joining the organization;

- General orientation to rules and regulations governing personnel issues;
- Orientation to working conditions, including the primary location where he/she reports to work and all areas where he/she may be required to perform job related tasks;
- Instruction in all safety and emergency responsiveness procedures and policies that may affect the employee's work;
- Instructions on work-place rules, including channels for communicating questions, complaints, or grievances;
- An introduction to all tools and equipment which the employee will be required to use while performing his or her work duties;
- Instruction on how to best perform individual work tasks;
- A clear description of precisely what the individual must do to meet the requirements of the job;
- An explanation of all criteria on which the individual will be evaluated, such as the tasks and performance standards for the specific job, and identification of who will be evaluating the employee's performance.

3.c Transfers

- An individual must be oriented and familiarized with a new position prior to being transferred to another work site or location.
- Transferred employees generally need no less than 30 days of on-site supervision at a new facility, depending on the differences in equipment and personnel that they will encounter.
- The use of different or unfamiliar equipment may require special training in the operation and repair of that type of equipment, as well as safety training for that particular site.

3.d Staff Training and Professional Development

"Staff Training" refers to learning opportunities designed specifically to help an employee do his or her job better. "Professional Development" has a broader meaning, which includes expanding the participant's knowledge and awareness to areas outside of their specific job duties, yet still related to the overall well being of the organization. These topics may include:

1. Asbestos Awareness and Training.
2. Emergency Responsiveness.
3. First Aid/CPR.
4. Biohazard Disposal.
5. Use of Technology.
6. OSHA Safety Training.
7. Energy Management.

Professional Development allows the employee to receive advanced training in order to achieve a higher skill level or advanced certification. This assists the organization in filling higher positions with qualified employees as the positions become available in the future, and promotes employee morale by generating opportunities for upward mobility.

Reference: National Center for Education Statistics and the National Cooperative Education Statistics System, *Planning Guide for Maintaining School Facilities*, Chapter 6: "*Managing staff and contractors*" (School Facilities Maintenance Task Force, Publication #NCES 2003347, February, 2003)

For ordering information on this report, write:

U.S. Department of Education

ED Pubs

P.O. Box 1398

Jessup, MD 20794-1398

Section IV

Average Life Cycle Expectancy for Equipment and Building Components

All life cycle figures are shown in years

Building System

Life Cycle

4.a Building Enclosures

Concrete Framing Systems:

Masonry Exterior	45-60
Metal Clad	40-50

Steel Framing Systems:

Masonry Exterior	40-50
Metal Clad	40-50

Wood Framing Systems:

Masonry Exterior	35-45
Metal Clad	35-60

4.b Roofing Systems

Built-up Systems (multi-ply):

Asphalt	10-25
Elastomeric	15-30
Polyurethane Foam	No useful life cycle available

Pitched Roof:

Asphalt Shingles	20-25
Metal/Standing Seam	40-50
Clay Tile/Slate	50-70

4.c Windows and Exterior Doors

Windows:

Metal Sash	40-50
Wood Sash	30-40
Aluminum Sash	25-30

Doors:

Aluminum Doors	25-30
Overhead Doors	20-40

4.d Interior Construction

Demountable Partitions	20-30
Acoustical Ceilings	20-30
Carpeting	5-15
VCT	15

Painted Surfaces Interior:

Classrooms, Offices, Hallways	10
Kitchens, Restrooms, Multi-purpose rooms	8

Painted Surfaces Exterior:

Stucco/Masonry	7
Wood & Metal	3

4.e Plumbing Systems

Fixtures	20-30
Water Heaters	10-20
Pumps	15-20
Steel Piping	30-40
Copper Piping	20-30
Fire/Sprinkler Systems	25-35

4.f Elevators

All Types	25
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4.g Heating, Ventilation and Air Conditioning**Boilers:**

Steel Water Tube	20-30
Steel Fire Tube	20-30
Electric	15-20

Heat Exchangers:

20-30

Burners	15-25
Economizers	10-20
Furnaces:	
Gas or Oil	15-20
Radiant Heating Units	20-30
Air Conditioners & Components:	
Water Cooled Package Units	10-20
Rooftop Units	10-20
Commercial Thru-wall units	10-20
Cooling Towers	10-20
Evaporative Condensing units	15-25
Air Cooled Condensing units	15-25
Package Chillers	15-25
Fans:	
Centrifugal	25-30
Axial	20-25
Propeller	15-20
Roof Mounted	20-25
Air Terminals:	
Induction and Fan Coil Units	20-25
Variable Air Volume Boxes	20-25
Steam Turbines	25-35
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4.j Summary

The above listed life cycle averages are based upon good quality components, installation in accordance with manufacturers' instructions and/or the requirements of the construction specifications, a level of maintenance over the useful life of the equipment or system that is consistent with the manufacturer and designer specifications, and maintaining appropriate internal environmental conditions. With good quality maintenance, these items can easily exceed the higher limit given for the component.

References:

Arizona School Facilities Board, *Average Life Cycle of Building Components*, Phoenix Jun 05, 2003.
<http://www.azsfb.gov/sfb/preventive%20maintenance/life%20expectancies.xls>

National Clearinghouse for Educational Facilities at the National Institute of Building Sciences, (NCEF). 1090 Vermont Ave., NW Suite 700, Washington, D.C. 20005 (Toll free: 888-552-0624; 202-289-7800 www.ncef.org)
Funded by a grant from the U.S. Department of Education

Section V

Summary of Maryland Requirements and Practices

5.a Annual Submission of the Comprehensive Maintenance Plan

By regulation, each local educational agency (LEA) is required to submit annually a Comprehensive Maintenance Plan (CMP) that has been approved by the Local Board of Education (COMAR 23.03.02.18.A.2). The CMP describes the LEA strategy for maintaining public school buildings and must be coordinated with their local Educational Facilities Master Plan (EFMP) and the local Capital Improvement Program (CIP).

The Interagency Committee on School Construction (IAC) or its designee shall notify the LEA of concerns and recommendations with regard to the comprehensive maintenance plan, and the LEA shall resolve the IAC's concerns to the reasonable satisfaction of the IAC and/or its designee.

The IAC may determine (COMAR 23.03.02.18.B.1, 2) that a project submitted in the annual CIP is ineligible for planning approval or funding approval for an existing school if:

- a. The school is not properly maintained; or
- b. The LEA does not have an adequate preventive maintenance program.

5.b Semi-Annual Roof Inspections

Beginning July 1, 2000 (FY 2001), each school system has been required to inspect their school roofs twice annually in order to be eligible for State funding for roof replacement projects. Copies of the inspection reports are to be retained for as long as the school is owned by the Local Board of Education. Copies of these reports may be required to support requests for State funding. Beginning in FY 2009, the roof inspection reports will become a required portion of the periodic facilities inspections performed by the Public School Construction Program (PSCP) inspectors.

5.c Preparedness for Utility Related Emergencies

The Maryland State Department of Education (MSDE) requires that each superintendent sign an Annual Assurances for Emergency Preparedness Procedures for Utility Related Emergencies form. After a student was scalded in 1997 by over-heated water, all public school systems were required to sign assurances that the following actions have taken place for each school building:

- Emergency plans for utility related emergencies are maintained in the school administrative office and the chief custodian's office.
- Small scale building and facility plans indicating the locations of utility cutoffs are part of the emergency plan and have been updated to reflect any building modifications.

- Employee training or cross training workshops have been conducted for new maintenance and operations staff in order to handle emergencies identified in the emergency plan.
- Training for new boiler operators has been provided.
- Training in the use of fire extinguishers has been provided for new building-based custodial and maintenance personnel and for new food service managers.

5.d PSCP Facility Inspections

Beginning in FY 2007, the PSCP hired two full time inspectors with the intention of inspecting all school facilities on a routine six year schedule by conducting approximately 230 new inspections and 28 re-inspections each year. As the FY 2007 inspections were completed in the spring of 2007, it was discovered that follow-up inspections were needed on a sample of schools to ensure that repairs had been completed as reported by the LEA. Since both the intensity and annual number of school inspections has increased, the school inspection program has become a new tool to assist the PSCP to achieve a better understanding of how maintenance is being performed by the LEA. This program has unmasked problems which would not have been apparent when only 100 inspections were being performed per year. An annual report is submitted to the Board of Public Works each fall, accompanied by an awards ceremony for those school systems that have one or more schools that have received a rating of Superior

It is our belief that the high level of attention given by the State to school maintenance through this program will eventually assist local maintenance programs to receive the budgeting and manpower that is needed to bring our schools to 21st century standards as safe, efficient, and problem free places of learning.

Section VI

Recommendations

Since maintenance begins immediately at the moment that a construction project has been given over to the owner, there are several good practices that need to be performed to ensure the integrity of the building from the very beginning:

- Operating staff of the LEA should be on-site for the last 90-120 days of construction to familiarize themselves with the placement and identification of all equipment which otherwise would be hidden behind walls and above ceilings.
- Building commissioning should be performed while the maintenance staff is present so that they can gain a precise understanding of how and why the equipment works as it does, as well as an understanding of the proper sequence of operation.
- The maintenance staff should be included in the tabulation and completion of the punch-list, since they will ultimately be responsible for oversight of the quality of the facility.
- Record documents such as Record (As-built) Drawings, Shop Drawings and Specifications, Operations and Maintenance (O&M) manuals, and instructional materials should be retained for future use by the Administration in a central location, and one or more sets of the same documents should be kept in the School Office and in the School Engineers office.
- Due to the large turn-over of custodial personnel, a video taping of contractor demonstrations of the mechanical and electrical equipment operations should be maintained by the facilities office for purposes of training new personnel in the proper operation and use of the equipment at that building.
- In addition to the staff training outlined in Section III, the training of new and returning principals in the complete range of their facility responsibilities, from routine maintenance to initiating a major capital project, should be a regular component of the orientation process administered by the school administration.

For further information, contact:

Mr. Donn Grove, PSCP Maintenance Inspector, 410-767-2347

Mr. Anthony Lassiter, PSCP Maintenance Inspector, 410-767-0619

PROCEDURE MANUAL
for
PROFESSIONAL SERVICES



**STATE OF MARYLAND
DEPARTMENT OF GENERAL SERVICES**

Alvin C. Collins, Secretary

OFFICE OF FACILITIES PLANNING, DESIGN AND CONSTRUCTION

PROJECT MANAGEMENT AND DESIGN DIVISION

*State Office Building
301 West Preston Street, Room 1405
Baltimore, Maryland 21201*

July, 2003

FOREWORD

This Procedure Manual is incorporated by reference and made a part of the Standard Form of Agreement with Architects and Engineers. In the event of any conflict between the provisions of this manual and the provisions of the Architect/Engineer agreement, the provisions of the Architect/Engineer agreement shall govern.

This Manual has been prepared to serve as a guide for providing professional services during all phases of design and the preparation of contract documents for the construction, alteration or renovation of State buildings. It is intended that the procedures outlined herein shall be followed to the fullest extent practicable for other State public improvements such as special structures, roads, utilities, site improvements, etc.

It is further intended to include all professional services. The term "Architect/Engineer" (A/E) includes architects, engineers, landscape architects, and other qualified professionals who may furnish such services in the development of State public improvements.

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CHAPTER VII

TITLE: STANDARDS FOR NEW ROOFING CONSTRUCTION, RE-ROOFING CONSTRUCTION AND ROOFING SYSTEM GUARANTEE REQUIREMENTS	Revised: July 2003
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Responsible Organization: Office of Facilities Planning
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Instructions: This procedure supersedes the DGS Procedure Manual for Professional Services, dated July 1998. Please recycle the superseded document.

1 GENERAL

1.1 FOR NEW BUILDING PROJECTS, the selection of either a steep slope or low slope roofing system shall be based on the results of a 60 year life cycle cost analysis. This analysis shall consider the scope impact on building structural, mechanical and electrical systems required to configure the building for both a steep slope and a low slope roofing system, as well as the maintenance and replacement intervals and costs for both roofing systems.

1.2 FOR ROOF REPLACEMENT PROJECTS, the selection of the replacement roofing system shall be based on an evaluation of costs associated with factors affecting the proposed system, including span dimension, structural condition, foundation design/capacity, and disposition or accommodation of roof top equipment.

1.3 ROOFS ON NEW CONSTRUCTION shall be pitched to drains or gutters, with the roof slope achieved structurally.

1.4 REFERENCES TO NATIONAL STANDARDS DOCUMENTS such as the American Society for Testing Materials (ASTM), American National Standards Institute (ANSI), Factory Mutual System (FM), Underwriters' Laboratories (UL), International Building Code (IBC), American Institute of Steel Construction Manual (AISC), Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), National Roofing Contractors Association (NRCA), National Institute of Standards and Technology (NIST), Asphalt Roofing Manufacturers' Association (ARMA), etc., shall be interpreted to refer to the most current edition or revision in effect at the time a design is in progress as this takes precedence.

1.5 ALL MATERIALS used for roofing systems shall be asbestos free.

CHAPTER VII
STANDARDS FOR NEW ROOFING CONSTRUCTION, REROOFING
CONSTRUCTION AND ROOFING SYSTEM GUARANTEE REQUIREMENTS

1.6 A SITE VISIT to verify existing conditions will be made for all roof replacement and roof repair projects to verify existing conditions and dimensions even though as-built drawings are provided. Where composition, thickness or make up of the existing roof system or any of its components cannot be determined by visual means alone, an exploratory investigation shall be conducted to include dismantling or opening up a representative portion of the roof system. Patch and make watertight all areas disturbed during investigation.

2 STEEP SLOPE ROOFS

2.1 STEEP SLOPE ROOFS with a minimum slope of 2-1/2 inches per foot, may be finished with a standing seam metal or sheet metal system or a fiberglass shingle system surfaced with ceramic coated mineral aggregate. All steep slope roofs must have a full width (36") of modified bitumen ice dam protection membrane installed at all eaves and valleys.

2.2 STANDING SEAM METAL ROOFING SYSTEMS shall be fabricated metal panel systems from nominal 22 gauge G-90 galvanized steel conforming to ASTM A446 Grade A and ASTM A525. Alternative panel thickness of 24 gauge or 20 gauge may be considered based on an evaluation of roof framing and purlin spacing. All standing seams shall be double locked with a seam height no greater than 1½ inches.

The system shall conform to the requirements of ANSI Publication A 58.1, BOCA, and the American Institute of Steel Construction Manual. The panels shall have a UL Class 120 rating and the structural uniform uplift load capacity shall be in accordance with ASTM E330. The finish shall be equal to at least 70% Kynar and shall be tested in accordance with ASTM procedures. The system shall have a 20 year manufacturer's weatherproof warranty. The Kynar color finish shall also be covered by a 20 year manufacturer's warranty.

2.3 ASPHALT SHINGLES shall be reinforced with fiberglass wind resistant type, UL Class A, and comply with ASTM D3462 and ICBO ES AC 127. Shingle manufacturer shall provide a 40 (+) year warranty covering repair or replacement of defective shingles as necessary to eliminate leaks. Where "Nailbase" insulation is used ventilation must be provided. Metal drip edges must be installed on all eave and rake edges.

CHAPTER VII
STANDARDS FOR NEW ROOFING CONSTRUCTION, REROOFING
CONSTRUCTION AND ROOFING SYSTEM GUARANTEE REQUIREMENTS

2.4 SPECIAL ROOFS: Under special conditions relating to aesthetic compatibility with surrounding buildings or historical consideration, the use of clay tiles, slate tiles, or cedar shakes may be deemed appropriate. In these cases specifications and details shall be developed in strict accordance with applicable national standards. The roofing tile or slate manufacturer/quarrier shall provide material defects warranty coverage of 20 years minimum to 50 years or more based on the specific roof material and facility under consideration.

2.5 STEEP SLOPE ROOFS shall be provided with adequate means for interior ventilation through eave or soffit louvers, ridge vents, ventilation boards and thermostatically controlled power fans to prevent moisture condensation and excessive heat under roofing or sheathing.

3 LOW SLOPE ROOFS

3.1 LOW SLOPE ROOFS shall be required to have a minimum slope of 1/4 inch per foot. New buildings shall be designed to achieve the minimum slope of 1/4 inch per foot structurally. Existing buildings may have to be provided with tapered insulation to achieve the minimum slope. Lightweight concrete shall not be used to create slope.

3.2 PRIOR TO PLACEMENT OF INSULATION and the roofing system, all low slope roof decks shall have:

A. Steel Deck: 1" perlite insulation mechanically fastened and 2 plies of fiberglass felts.

B. Concrete Deck: Asphaltic primer and 2 plies of fiberglass felts.

C. Nailable Decks: (other than Wood, Lightweight Concrete, Gypsum, and Tectum) Rosin-sized sheathing paper, 75 lb. ventilated base sheet, mechanical fasteners dictated by deck type, and 2 plies of fiberglass felts.

D. Wood Decks: Mechanically fasten 1" thick perlite insulation to deck and install 2 plies of fiberglass felts with hot asphalt.

- (1) If wood deck is less than 3/4" thick, nail base sheet to deck and install 2 plies of fiberglass felt over base sheet.

JUN 25 2004



STATE OF MARYLAND
PUBLIC SCHOOL CONSTRUCTION PROGRAM
200 W. BALTIMORE STREET
BALTIMORE, MARYLAND 21201
410-767-0610

DAVID G. LEVER
EXECUTIVE DIRECTOR
NANCY S. GRASMICK
CHAIRPERSON

ROBERT L. EHRLICH, JR.
GOVERNOR

INTERAGENCY COMMITTEE ON SCHOOL CONSTRUCTION

MEMORANDUM
Tom C...

To: Superintendent of Schools
Facility Planners
Directors of Maintenance
Fiscal Officers

From: David Lever *DL*

Date: June 22, 2004

Subject: State Roofing Policy

We would like to notify you about changes that have been made in the State Roofing Policy - July 2003, Part I, Chapter VII, found on the website at <http://www.dgs.state.md.us/overview/const2.htm>. The items listed below modify previous policy or represent new additions to the State policy.

60-Year Life Cycle Cost Analysis. At the meeting of June 2, 1999, the Board required that the design of roofs for new schools or additions be based on a 60-year life cycle cost analysis. The 60-year life cycle cost analysis is no longer required to be performed for any State funded projects.

Modified Bitumen Roof Systems. Modified Bitumen roof systems will now be allowed for public school construction projects (new roofs and re-roofing projects). The prohibition against use of these systems centered around the blistering that resulted from freon off-gassing produced by Isocyanurate insulation, and the delamination of cap sheets. These problems can be prevented if the following practices are followed:

- As with standard built-up roofing practices, a layer of Perlite (or other material as approved by the membrane manufacturer) insulation must be installed over the Isocyanurate insulation to contain off-gasses.
- All cap sheet corners are to be rounded in the field by the roofing mechanic as the material is installed. Through extensive testing, we have determined that this simple procedure has reduced the problems associated with cap sheet delamination by 90%. The delamination always started at the corners of the cap sheet, no matter how well they were embedded in asphalt or torched down.

As a word of caution, we greatly discourage the practice of torch-applied Modified Bitumen roofing. 63% of all construction related fires last year in the state of Maryland were caused by this method of roofing.

If you have any questions about these changes in State roofing policy, please contact me or Mr. Joseph M. Hevey, Sr., Roofing Program Manager/Roofing Engineer, State of Maryland - Dept. of General Services, Ph.- 410-767-4617, Fax- 410-333-7003.

DL:dgl

cc: Al Abend
Barbara Bice
Joan Schaefer
Jim Noonan
Joe Hevey

DGS roofing policy, replacing the policy issued with the June 1991 edition of the Procedure Manual for Professional Services

5. **STANDARDS FOR NEW ROOFING CONSTRUCTION, REROOFING CONSTRUCTION, REROOFING OF EXISTING BUILDINGS AND ROOFING SYSTEM GUARANTEE REQUIREMENTS.**

5.1 **GENERAL:**

- a. All roofs on new construction shall be pitched to drains or gutters, with the roof slope achieved structurally if feasible.
- b. References to national standards documents such as the American Society for Testing Materials (ASTM), American National Standards Institute (ANSI), Factory Mutual System (FM), Underwriters' Laboratories (UL), Building Officials and Code Administrators (BOCA), American Institute of Steel Construction Manual (AISC), Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), National Roofing Contractors Association (NRCA), National Institute of Standards and Technology (NIST), etc., shall be interpreted to refer to the most current edition or revision in effect at the time a design is in progress.
- c. All materials used for roofing systems shall be asbestos free.

5.2 **STEEP SLOPE ROOFS:** Steep roofs with a minimum slope of 2 1/2 inches per foot, may be finished with a standing seam metal or sheet metal system or an asphalt coated fiberglass shingle system surfaced with ceramic coated mineral aggregate.

- a. **Standing Seam Metal Roofing Systems** shall be fabricated metal panel systems from nominal 22 gauge G-90 galvanized steel conforming to ASTM A446 Grade A and ASTM A525. Alternative panel thickness of 24 gauge or 20 gauge may be considered based on an evaluation of roof framing and purlin spacing. All standing seams shall be double locked. The system shall conform to the requirements of ANSI Publication A 58.1, BOCA, and the American Institute of Steel Construction Manual. The panels shall have a UL Class 90 rating and the structural uniform uplift load capacity shall be in accordance with ASTM E330. The finish shall be equal to at least 70% Kynar and shall be tested in accordance with ASTM procedures. The system shall have a 20 year manufacturer's warranty. The Kynar color finish shall also be covered by a 20 year manufacturer's warranty.
- b. **Asphalt Shingles** shall be reinforced with fiberglass wind resistant type, UL Class A, and comply with ASTM D3018 Type I and ASTM D3462. Shingle manufacturer shall provide a 30 year warranty covering repair or replacement of defective shingles as necessary to eliminate leaks.
- c. **Special Roofs:** Under special conditions relating to aesthetic compatibility with surrounding buildings or historical consideration, the use of clay tiles, slate tiles, or cedar shakes may be deemed appropriate. In these cases specifications and details shall be developed in strict accordance with national standards organizations requirements. The roofing tile or slate manufacturer shall provide material defects warranty coverage of 20 years minimum to 50 years maximum based on the specific roof material and facility under consideration.

- d. **Steep slope roofs** shall be provided with adequate means for interior ventilation through eave or soffit louvers to prevent moisture condensation under metal roofing or sheathing.

5.3 LOW SLOPE ROOFS: Low slope roofs shall be required to have a minimum slope of 1/4 inch per foot. New buildings shall be designed to achieve the minimum slope of 1/4 inch per foot structurally. Existing buildings may have to be provided with tapered insulation to achieve the minimum slope. Lightweight concrete shall not be used to create slope. Prior to placement of insulation and the roofing system, all low slope roof decks shall have a two ply vapor retarder installed in hot asphalt.

On low slope roofs from 1/4 inch per foot up to 2 1/2 inches per foot, the following types of roofing systems shall be evaluated in the preliminary or schematic design phase of a project to identify the optimum roofing system for the building under consideration. In general a four ply built-up roofing system is preferred. Modified bitumen membrane and single ply membrane systems are considered acceptable alternatives.

- a. **Four Ply Built-up System:** This system shall consist of four plies of roofing felts alternately placed and overlapped and saturated with hot asphalt bitumen. Roofing felts shall be glass fiber and shall meet the requirements of Tables 1 and 2 ASTM D-2178 Type VI (Asphalt Impregnated). Steep roofing asphalt shall conform to ASTM D-312, Type III.

The manufacturer's warranty shall cover the roofing system material, the insulation and the base flashing, and shall be for a term of 20 years with no dollar limit.

- b. **Modified Bitumen Membrane System:** The roofing system shall consist of a reinforced APP or SBS polymer-modified bitumen membrane over a fiberglass base sheet and two plies of Type VI roofing felts, or modified bitumen membrane over three plies of Type VI roofing felts. One or two plies of modified bitumen membrane may be installed. The bottom ply must be smooth surfaced, and the top ply must be granule surfaced. Loose granules must be embedded at all end and side laps while asphalt is hot. Membrane shall be installed by the standard method of hot asphalt mopping. All modified bitumen membrane materials shall conform to ASTM D5147 procedures, and shall meet the interim standards of the National Institute of Standards and Technology (NIST) Building Science Series Publication BSS 167. Steep roofing asphalt shall conform to ASTM D312 Type III. Roofing felts shall be glass fiber and shall conform to ASTM D2178 Type VI. Asphalt coated base sheets shall conform to ASTM D4601 or D4897. Guarantee by manufacturer shall cover membrane, base sheets, insulation, and base flashings for a term of 20 years with a no-dollar limit.

- c. **Single Ply Membrane System:** Occasionally, specific project conditions, or peculiar project constraints may suggest the practical utilization of a single-ply membrane roofing system. Utilization of EPDM, Hypalon, PVC, CPVC and related type roofing materials may be considered if reviewed with and approved by DGS. Such applications shall be in strict and complete conformance with the installation recommendations of the particular manufacturer. Guarantee by manufacturer shall cover roof membrane, insulation, and flashing system for a term of not less than 15 years with a no-dollar limit.

5.4 INSULATION

- a. All low slope roofing systems shall include insulation. The majority of insulating value shall be accomplished with the necessary thickness of flat polyisocyanurate boards. Where necessary, roof slope shall be developed with tapered perlite board. Organic insulation material shall not be used under built-up roofs. Light weight concrete insulating fill is not acceptable.
- b. **Heat Transmission:** Insulation heat transmission values shall be established in accordance with the latest revision of the DGS Energy Conservation Guidelines. For new buildings the suggested insulation value of the roof area envelope is R-30. For roof replacements/renovations on older buildings, a lower "R" value will be considered.
- c. **Structural:** The first ply of insulation systems over metal decks and wood decks shall be mechanically fastened using steel fasteners acceptable to the manufacturer furnishing guarantee of roofing system. Insulation shall also be installed in accordance with Factory Mutual System 1-90 wind uplift guidelines.
- d. **Compatibility:** Insulation material installed between the roof deck and the roof ply shall be compatible with the roof ply material and asphalt bitumen binder or other adhesive used in the roofing system.
- e. **Warranty:** Insulation materials shall be considered an integral component of the roofing system; and shall be furnished or approved by the roofing system supplier or manufacturer; and shall be covered by the roofing system warranty.
- f. Insulation shall be applied in several layers, with the joints staggered, in accordance with the manufacturer's recommendation.

5.5 FLASHINGS

- a. **Base Flashing** is part of the roofing system and shall meet requirements of manufacturer furnishing roofing system. Where roof meets a parapet or adjacent building wall, the base flashing shall extend up the wall at least 8 inches, but generally not more than 2 feet unless necessary to be consistent with existing conditions or design requirements.
- b. **Other Flashing:** Other than base flashing - metal flashing including expansion joint flashing shall be in accordance with SMACNA Standards and the NRCA Roofing and Waterproofing Manual. Pitch pockets are to be avoided. Roof penetrations will be flashed with preformed flexible flashings using clamps and tents unless the penetration is such a complex shape that a pitch pocket is required.

- 5.6 **ROOF DRAINS** shall be provided with shallow sumps, gravel stops, and minimum 4.0 pound lead flashings in accordance with the NRCA Roofing and Waterproofing Manual. Drains will be located wherever possible at the low points, and crickets must be provided between drains in structurally formed valleys to assure positive water low to the drains. Roof drainage patterns should be designed to locate roof drains at the mid-points between columns and beams. Overflow scuppers should be provided through perimeter parapet walls to relieve storm water build-up caused by clogged roof drains. Where roof drainage is directed to exterior downspouts, splash blocks shall be provided at all ground discharge points. Where possible, downspouts may discharge directly into a storm drainage system.



PARRIS N. GLENDENING
GOVERNOR

STATE OF MARYLAND
PUBLIC SCHOOL CONSTRUCTION PROGRAM
200 W BALTIMORE STREET
BALTIMORE, MARYLAND 21201
410-767-0610

INTERAGENCY COMMITTEE ON SCHOOL CONSTRUCTION

NEEDS TO BE MAILED

Mr. Kurt Buckler
Baltimore County BOE

① Dick/Olivia Community
on Insp/Survey Form

② Jack Finkle
YALE STENZLER
EXECUTIVE DIRECTOR

NANCY S. GRASMICK
CHAIRPERSON

③ CC for FY2001
Budget

RECEIVED

2000-10-05

MEMORANDUM

TO: All Superintendents of Schools
All Facility Planners
All Directors of Maintenance
Local Government Representatives
Other Interested Parties

FROM: Yale Stenzler, Executive Director

DATE: July 30, 1999

SUBJECT: Revised Roofing Policy

Enclosed for your information is a copy of the letter we received from Ms. Peta Richkus, Secretary of the Department of General Services, pertaining to the revised Statewide roofing policy approved by the Board of Public Works. Also enclosed is a copy of the agenda item that was approved.

You will note that the current roofing policy for the replacement of existing roofs remains unchanged. These roof replacement projects whether part of a major renovation, a systemic renovation, or an Aging School Program project will require a minimum slope of 1/4 inch per foot and a 20-year no dollar limit (NDL) warranty.

The roof for a new school or an addition (except for special or unique conditions) for which planning approval is being requested in the FY2001 CIP will be required to comply with this revised roofing policy. This will provide time to consider the potential costs for A/E services and the estimated cost of construction. These roofs will require that the design be based upon a 60-year life cycle cost analysis and that a 20-year no dollar limit (NDL) warranty be provided. A school system may, however, voluntarily implement the revised policy for new schools or additions at an earlier date.

Beginning in FY2001 (July 1, 2000) each school system will be required to inspect their school roofs twice per year to be eligible for State funding for roof replacement projects. Copies of the inspection reports should be retained while the school is owned by the board of education. Copies of these reports may be required to support requests for State funding. Enclosed for your information and consideration is a sample roofing inspection/survey form that was developed by representatives from several school systems. Your comments and suggestions are solicited.

At a later date we will be discussing training programs for roofing inspections and inspectors during roofing installations, as well as the pre-qualification of contractors.

If you have any questions regarding this material or need additional information, please contact us.

YS:am
enclosure

ck/Olivia
w will this
check 2/3
1/2 Design
Schedule next *

ck *

- 5.7. **ROOF ACCESS:** Permanent access to all roof areas from the inside of the building shall be provided for all buildings over two stories high with low slope roofs. Roof access for one and two stor buildings with low slope roofs and for buildings with steep slo roofs will be evaluated based on building and roof configuration and roof type.
- 5.8 **ROOF MOUNTED EQUIPMENT** shall be minimized; penthouse enclosures of equipment are preferred.
- a. Roof mounted equipment shall be installed on curbs and shall be provided with suitable vibration isolation devices.
 - b. If it is necessary to mount equipment above the roof, without using a curb, sufficient clearance shall be provided under the equipment to permit maintenance of the roofing system.
 - c. Inorganic walking pads shall be provided from roof access to roof mounted equipment.

roofings.bg

Parris N. Glendening
Governor

Kathleen Kennedy Townsend
Governor



MARYLAND DEPARTMENT OF GENERAL SERVICES
OFFICE OF THE SECRETARY

Peta N. Richkus
Secretary

Michele T. Rozner
Deputy Secretary

July 19, 1999

Dr. Yale Stenzler, Executive Director
Public School Construction Program
200 W. Baltimore Street
Baltimore, Maryland 21201-2595

Re: Statewide Roofing Policy

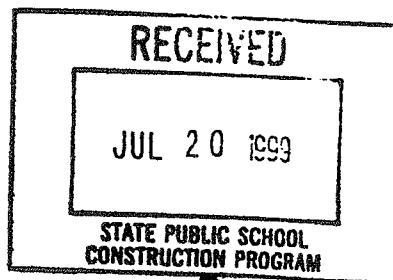
Dear Dr. Stenzler:

The Board of Public Works has approved the revised Statewide Roofing Policy, a copy of which is attached. The policy affects only those projects included in the FY 2001 budget and beyond, and focuses on the three primary factors where the State can achieve positive results, namely design, installation, and maintenance.

As relates to design: new construction projects will require a 60-year life cycle cost analysis. Roof replacement projects will require a less formal analysis, and will consider all factors affecting the proposed roof replacement, including span dimension, structural condition, roof top equipment, etc. Each agency will determine the roof type based upon the analysis of the costs associated with these factors. To the degree possible, flat roof replacements should add some slope to promote runoff.

Proper roof system installation, the second factor, is the procuring authority's responsibility. Therefore, each procuring authority is accountable for training or hiring inspectors and for hiring qualified contractors to properly install roof systems.

In addressing the maintenance factor, beginning with the FY 2001 budget each agency is responsible for inspecting their roofs at least twice per year, and will make resources available for said inspections. Inspection records will be retained for the duration of building ownership.



Dr. Yale Stenzler
Page 2

If you have any further comments or questions, please do not hesitate to contact me at 410-767-4960 or have a member of your staff contact Mr. Thomas R. Genetti, Assistant Secretary for Facilities Planning, at 410-767-4214.

Sincerely,



Peta N. Richkus
Secretary

PNR:cb
Attachment

DEPARTMENT OF GENERAL SERVICES
ACTION AGENDA

GENERAL/MISCELLANEOUS

ITEM

DESCRIPTION

Board of Public Works approval is requested for a revised Statewide Roofing Policy.

New Construction

1. No roof will be approved for State funding that does not have at least a 20-year, no dollar limit (NDL) warranty according to the DGS roofing policy initiated in 1989, formalized in 1995, and which is being revised in 1999.
2. All new construction will require a 60-year life cycle cost analysis to determine the proper roofing system.

Roof Replacement

1. No roof will be approved for State funding that does not have at least a 20-year, no dollar limit (NDL) warranty according to the DGS roofing policy initiated in 1989, formalized in 1995, and which is being revised in 1999.
2. Roof replacement projects will consider all factors affecting the proposed system, including span dimension, structural condition, foundation design/capacity, roof top equipment, etc. Each agency will determine roof type based upon costs associated with these factors.

General

1. Beginning with the FY 2001 budget, all projects will be governed by this policy.
2. Effective in FY2001, each agency will inspect their roofs at least twice per year and agencies will make resources available for said inspections. Inspection records will be retained for the duration of building ownership.
3. All agencies are to follow this roofing policy, including Community Colleges, Public Schools, Universities, Department of Transportation, Department of Public Safety and Correctional Services, St. Mary's College, Morgan State University and Capital Grants & Loan Program projects.

Continued

DEPARTMENT OF GENERAL SERVICES
ACTION AGENDA

GENERAL/MISCELLANEOUS

ITEM

REMARKS

Proper roof system installation is the procuring authority's responsibility. Each procuring authority is accountable for training inspectors and hiring qualified contractors to properly install roof systems.

To help support adequate roof maintenance, DGS will conduct seminars for facility maintenance personnel at strategic locations around the State.

Board of Public Works Action - The above referenced Item was:

Approved

Disapproved

Deferred

Withdrawn

With Discussion

Without Discussion

bpwroof.599

ROOF INSPECTION/SURVEY FORM

(FILL OUT FOR EACH LEVEL OF BUILDING)

SCHOOL: _____ EQUIP. NO. _____

LEVEL _____ ROOF DECK _____

ROOF TYPE: BUR _____ EPDM _____ SHINGLE _____ METAL _____ SLATE _____ OTHER _____

WATERTIGHTNESS: NO LEAKS _____ LEAKS EVERY RAIN _____ LEAKS ONLY DURING HIGH
WINDS AND RAIN _____ LEAKS ONLY OCCASSIONALLY _____

CONDITION OF ROOF: (Indicate condition 1 Poor to 4 Excellent)

BLISTERS _____ RIDGES _____ SPLITS _____ EXPOSED FELTS _____ ERODED FELTS _____

DRAINS _____ ALLIGATORING _____ GRAVEL STOP _____ DEBRIS/VEGETATION _____

PUNCTURES _____ SEAM SEPARATION _____ PONDING WATER _____ PITCH PANS _____

EXPANSION JOINT _____ PARAPET CAP _____ PARAPET METAL _____ GUTTERS _____

DOWNSPOUT _____ COUNTER FLASHING _____ DRAIN STRAINER _____

INSULATION: YES _____ NO _____ TYPE/CONDITION: _____

ADDITIONAL INFORMATION: _____

OVERALL ROOF CONDITION _____ (1 Poor to 4 Excellent)

PHOTOGRAPHIC/VIDEO RECORD: YES _____ NO _____ IDENTIFY THE AREA BEING SHOWN,
THE ITEM, AND THE DATE.

ROOF PLAN: Draw a roof plan on the reverse side. Following the key provided show the location of all
problem areas found. Also, note any changes to roof since it was first completed.

INSPECTED BY: _____ DATE: _____

H - HATCH
E - EXHAUST FAN
P - PENTHOUSE
A - AIR-HANDL. EQUIP.
V - RELIEF VENT
S - SKYLIGHT
BL - BLISTER
RG - RIDGES

FM - FISHMOUTH
DV - DEBRIS/VEGETA
PA - PATCHES
EF - EXPOSED FELTS
SP - SPLITS
PN - PUNCTURE
SS - SEAM SEPARATION
PD - PONDING

== - EXPANSION JOINT
人 - ANTENNA
● - DRAIN/DOWNSPOUT
≡ - SCUPPER
┌─┐ - LADDER
▢ - PITCH PAN
○ - VENT PIPE
/// - PARAPET WALL



INSTRUCTION: Schedules

Unplanned or Emergency Closures

No school, office, or system event cancellation or delay will be made without the direct authorization of the Superintendent of Schools.

1. Announcements

When the Superintendent decides it is necessary to delay opening or close any facility or school or cancel any system event, the Office of Transportation will initiate all related communications to the public. The Office of Transportation will contact the media, the BCPS website, BCPS Channel 73, and the Office of Communications for all emergency closing announcements. The Office of Communications will post all emergency closing information on the BCPS automated information line, 410-887-5555. Periodically throughout the year, the Office of Communications will advise students, parents, and employees to listen for emergency closing announcements on local media, the BCPS website, and the BCPS information line and not to call the school, the central office, or the radio or television stations.

2. Absences Due to Unplanned or Emergency Closures

If 12-month administrative and 12-month clerical personnel who are required to be on duty are absent due to inclement weather, such absence shall result in the loss of a personal business day, salary deduction, or in the case of employees who accrue vacation, the option of charging this absence to accrued vacation days. The procedure for classified personnel is covered in Policy 4270.

3. Delayed Opening of Schools

The Superintendent may delay the opening of schools upon determining that weather conditions are such that it appears extremely hazardous to operate school buses at the regular early morning hours, but that travel conditions will appreciably improve later in the morning. The public announcement will report the delayed opening and bus schedules, including the cancellation of morning kindergarten and morning pre-kindergarten if the delay is more than one hour. School opening times will be delayed accordingly. The Office of Transportation

RULE 6303

is responsible for initiating all communications with the public regarding the emergency closing announcement.

In this instance, personnel shall act as follows:

- a. All 12-month employees shall be expected to report to work at the regular time.
- b. Teachers, instructional assistants, paid helpers, personal assistants, and 10-month clerical employees may arrive at the delayed time.

Schools and offices shall close on the regular schedules. After-school activities and events will not be affected by a delayed opening.

4. Closing of Schools Only for the Entire Day

When the Superintendent determines that weather or other conditions exist or will develop that would make it unwise to open one or more schools any time during the day, the announcement communicated to radio and television stations shall state, "Baltimore County Public Schools are closed." The Office of Transportation is responsible for initiating all communications with the public regarding the emergency closing announcement.

In this instance, personnel shall act as follows:

- a. Administrative and 12-month clerical personnel shall report to the school on the regular schedule in order to open the school office for its normal function.
- b. All central offices will be open, and employees are expected to report to work on the regular schedule.
- c. For additional information regarding classified employees, see Policy 4270.
- d. All after-school activities and events will be cancelled.

5. Early Closings of Schools

- a. All Schools

Weather or other conditions may develop while schools are in session that may require that schools be closed early. When the Superintendent determines that schools will be closed early, all schools shall be notified by

RULE 6303

telephone, emergent Superintendent's bulletin, radio and television stations, the website, and Channel 73. The Office of Transportation is responsible for initiating all communications with the public regarding the emergency closing announcement. The closing time will be set in relation to the regular closing time of each school, and the announcement will indicate "all Baltimore County Public Schools will close ____ hour(s) earlier than the normal closing time." All schools must close in accordance with this announcement in order to coordinate transportation and so that parents may know when to expect children to arrive at home. Principals shall adjust school schedules, including lunch, in order to dismiss at the announced time.

Except for heat related closings, all after-school activities and events will be cancelled.

In the case of heat-related closings, school, church, community, and Recreation and Parks will determine whether or not to hold afternoon and evening activities based upon the availability of air-conditioned facilities. The local school administration and the Department of Physical Facilities will make this decision for school and community activities; the Department of Recreation and Parks will make this decision for their activities; the Coordinator for Athletics in the Baltimore County Public Schools will be consulted on decisions involving the cancellation of interscholastic events.

The Office of Transportation is responsible for contacting the media for the emergency closing announcement.

b. Selected Schools

Conditions may develop during the school day which makes it advisable to close certain schools while the majority of schools remain in session. The decision to close schools on an individual basis shall be made by the Superintendent upon the request of the Deputy Superintendent(s). Any principal who feels that his/her school should be closed during the school day shall consult with the Department of Physical Facilities and the Office of Transportation and discuss the matter. The Executive Director of Physical Facilities and the Director of Transportation will advise the Deputy Superintendent(s) before a final request is made to the Superintendent. In these cases, it shall be necessary to coordinate this closing with other schools which use the same buses.

Principals of elementary schools shall implement procedures to ensure that the parents or guardians of each child are contacted and are aware of the impending closure. If a parent or guardian is not reached to confirm the dismissal, elementary children shall remain with school personnel at the school. The Principal must be able to account for what dismissal arrangements have been made for each child in the affected school.

A public announcement of the closing of the affected schools will be made. The Office of Transportation is responsible for initiating all communications with the public regarding the emergency closing announcement.

Each school is responsible for ensuring that every parent/guardian completes the emergency dismissal form and returns it promptly to the school at the beginning of every school year. Each school should encourage parents/guardians to discuss the emergency plan with their children so that children know what emergency procedures they are to follow in the case of an unexpected school closing. In view of this, the decision to close a few schools shall be weighed carefully and kept to a minimum.

All after-school activities and events in the affected building(s) will be cancelled.

6. Afternoon and Evening Program Cancellations

When schools are open to the end of the school day, but weather or other conditions deteriorate in the late afternoon, the Superintendent may decide to cancel afternoon and evening programs. Schools and offices should plan and communicate alternate dates and times to hold programs or events.

a. Afternoon and Evening Closings

When schools are open to the end of the school day, but weather or other conditions deteriorate in the late afternoon, the Executive Directors of Departments and offices that operate evening activities will consult with the Office of Transportation and the Department of Physical Facilities to review the weather conditions and make a recommendation to the Deputy Superintendent(s) regarding closing facilities or canceling events. This recommendation will typically be based on the announcement that the

Baltimore County snow emergency plan is in effect or will be going into effect during the time of an event. Upon the request of the Deputy Superintendent(s), the Superintendent will make a decision regarding canceling afternoon programs or events by 1:30 p.m. and evening programs or events by 4:00 p.m. The Office of Transportation is responsible for initiating all communications with the public regarding the emergency closing announcement and will announce: "Baltimore County Public School afternoon and evening programs will be cancelled."

7. Weekend Closings

When weather or other conditions are predicted or develop that would make it hazardous to operate weekend programs or events, the Executive Directors of Departments and offices that operate weekend activities will consult with the Office of Transportation and the Department of Physical Facilities to review the weather conditions and make a recommendation to the Deputy Superintendent(s) regarding cancellations. This recommendation will typically be based on the announcement that the Baltimore County snow emergency plan is in effect or will be going into effect during the time of an event. Upon the request of the Deputy Superintendent(s), the Superintendent will make a decision regarding canceling weekend programs or events. The Office of Transportation is responsible for initiating all communications with the public regarding the emergency closing announcement and will announce: "All Baltimore County Public School weekend events are cancelled." This notification will normally be made by 6:30 a.m.

If snow emergency plans are lifted during the weekend, opening of the facility will be contingent on the clearing of parking lots and sidewalks. The local school administrator and the Department of Physical Facilities will make a recommendation to the Deputy Superintendent(s) regarding whether or not to open for school activities. Upon the request of the Deputy Superintendent(s), the Superintendent will make a decision regarding opening of facilities. The Department of Recreation and Parks, in consultation with the Department of Physical Facilities, will make the decision for recreational programs.

8. Closing of the School System

When weather conditions are such that all travel is extremely hazardous, the Superintendent may decide to close the entire school system. The Office of Transportation is responsible for initiating all communications with the public regarding the emergency closing announcement and will announce, "All Baltimore County Public Schools and offices are closed."

In this case, only specifically designated essential personnel required to maintain the facilities and equipment shall report to work. The Department of Human Resources will notify the appropriate employees of their status as essential personnel on an annual basis.

9. Use of School Buildings

On days when schools are closed for inclement weather or other unplanned emergencies, all planned use of the school facilities, including after-school activities, evening classes, professional staff meetings, Board meetings, and other countywide school system events will be canceled.

10. Snow Removal

The Department of Physical Facilities will coordinate snow removal with the Baltimore County Government.

11. Emergency Conditions

The Deputy Superintendents are to be advised by site-based personnel or the Department of Physical Facilities of any emergency conditions which exist on school grounds.

Rule

Superintendent of Schools

Approved: 11/21/68

Revised: 2/9/84

Revised: 3/26/02

Revised: 3/22/05